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#### **USAAVLABS TECHNICAL REPORT 68-1**

# FLIGHT LOADS INVESTIGATION OF COMBAT ARMED AND ARMORED CH-47A HELICOPTERS OPERATING IN SOUTHEAST ASIA

By

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March 1968

## U. S. ARMY AVIATION MATERIEL LABORATORIES FORT EUSTIS, VIRGINIA

CONTRACT DA 44-177-AMC-363(T)

TECHNOLOGY INCORPORATED DAYTON, OHIO

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#### Task IF125901A14607 Contract DA 44-177-AMC-363(T) USAAVLABS Technical Report 68-1 March 1968

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#### **ABSTRACT**

From a structural flight loads program on three armed and armored CH-47A helicopters, 207 hours of valid multichannel flight data were recorded as the helicopters operated from air bases in Southeast Asia. Data were processed and analyzed according to four distinct flight phases, termed mission segments: (1) takeoff and ascent; (2) maneuver; (3) descent, flare, and landing; and (4) steady state. Data are presented in the form of time and occurrence tables, histograms, and exceedance curves. These data indicate the time spent in the mission segments and parameter ranges; the number of peak parameter values occurring in the ranges of the given parameter, during each of the mission segments, and in the ranges of one or more related parameters; and the time to reach or exceed given maneuver and gust normal load factors and lateral and longitudinal load factors. The largest normal load factor was 1.95, which occurred at a 100-knot airspeed and with a 28,027-pound gross weight. In contrast to previous studies of cargo and transport CH-47A's whose activity was mostly under steady-state conditions, the armed CH-47A's spent more than half of their time in the maneuver mission segment and had a much more pronounced loads spectrum.

#### **FOREWORD**

Technology Incorporated, Dayton, Ohio, prepared this report to cover its effort on a flight loads program to collect, process, and analyze 200 hours of valid flight data from three armed and armored CH-47A helicopters operating in Southeast Asia. This flight loads program was an integral part of a comprehensive CH-47A program which also included data collected from three unarmed CH-47A's. USAAVLABS Technical Report 68-2 presents the results of the data acquisition for the unarmed aircraft. The total program was sponsored by the U.S. Army Aviation Materiel Laboratories, Fort Eustis, Virginia, under Contract DA 44-177-AMC-363(T). The Army project monitor for all programs was Mr. William T. Alexander.

The prime Technology Incorporated personnel engaged in this program were as follows: Mr. Joseph F. Braun, project engineer, who directed the installation and operation of the data recording systems; Mr. John Nash, who directed the data digitizing; Mr. William Morrin, who wrote the computer programs for the data processing; and Messrs. Larry Clay and F. Joseph Giessler, who analyzed and compiled the data.

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#### LIST OF SYMBOLS

Symbol		Computer Equivalent
$c_{\mathtt{T}}$	thrust coefficient	CT
C <sub>T</sub> /σ	thrust coefficient ratio	CT/S
$h_d$	density altitude, feet	
$n_{\mathbf{z}}$	normal load factor	NZ
$n_{\mathbf{x}}$	longitudinal acceleration	NX
ny	lateral acceleration	NY
OAT	outside air temperature, °F	
Pa	atmospheric static pressure, inches of mercury	
R	rotor radius, 29.55 feet	
v	airspeed, feet per second or knots	
<b>w</b> .	gross weight, pounds	
μ	rotor tip speed ratio	MU
π	ratio of circumference to diameter of circle	
ρ	local air density, lb-sec <sup>2</sup> /ft <sup>4</sup>	
σ	rotor solidity, 0.062 (Reference 1)	S
Ω	rotor angular velocity, radians per second	

#### INTRODUCTION

Under contract to the U.S. Army Aviation Materiel Laboratories, Fort Eustis, Virginia, Technology Incorporated conducted a multichannel flight loads program on the armed and armored CH-47A helicopter. To acquire the desired data, three helicopters assigned to the 1st Cavalry Division (Airmobile), 228th ASHB, 1st Aviation Detachment, were each instrumented with flight loads recording systems. The serial numbers of the instrumented aircraft were 64-13145, 64-13149, and 64-13154. All recordings were made between August 1966 and May 1967, while the helicopters operated in Southeast Asia. From 470 hours of recorded flight data, 207 hours of valid data were processed, analyzed, and detailed in graphical and tabular form for their presentation in this report.

With normal acceleration separated into maneuver- and gust-induced categories, most of the data presentation consists of time and occurrence tables. Most of the tables are broken down into ranges of a third variable or of a third and a fourth variable for cross-correlation purposes. Significant aspects of the time tables are presented as histograms; the occurrence data for normal accelerations are presented as exceedance curves.

#### HELICOPTER DESCRIPTION

The armed and armored CH-47A is a special-purpose helicopter whose payload capability is used to mount extensive armaments for aerial fire support and armor to protect the crew and the helicopter. Specifically, this helicopter has five gunnery stations, two on each side and one aft; each is equipped with either a 7.62-mm or a .50-caliber machine gun. Fixed pylons on either side support 20-mm guns and either 2.75-inch rocket pods or 7.62-mm minigun pods. Extensive armor protects the crew and vital aircraft components.

These helicopters have the mission of providing aerial fire support while escorting airmobile formations; of performing reconnaissance and security operations; and of supporting other offensive, defensive, and retrograde actions as a part of a highly mobile arms team. Deployment is generally as a team to ensure mutual support and to decrease vulnerability of the aircraft as well as to increase rapidity and ease of target acquisition.

#### DATA RECORDING AND PROCESSING

#### DATA RECORDING

An oscillograph recording system was installed in each of the three CH-47A helicopters. The functional block diagram in Figure 1 illustrates the operation and integration of the components comprising the recording system. Ten parameters were recorded on the oscillograms: (1) airspeed, (2) altitude, (3) normal acceleration, (4) lateral acceleration, (5) longitudinal acceleration, (6) longitudinal cyclic control stick position, (7) collective control stick position, (8) rotor rpm, (9) outside air temperature, and (10) time. Between August 1966 and May 1967, 470 hours of flight data were recorded. Of these 470 hours, 207 proved to be valid. The valid data represent 564 flights and 266 engine starts.

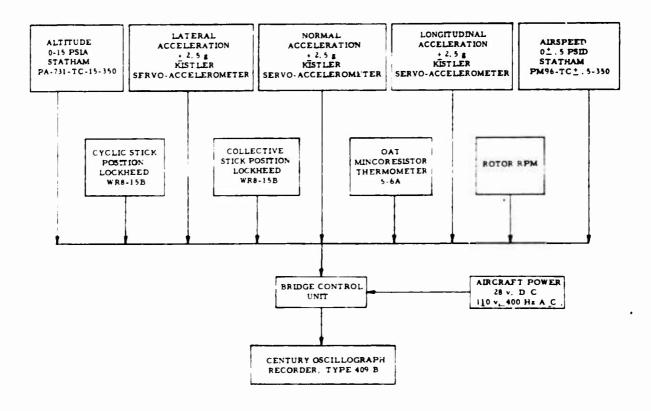


Figure 1. Block Diagram of CH-47A Instrumentation System

#### DATA EDITING

As the data processing editors first checked all oscillograms for evidence of any instrumentation malfunctioning, they removed all faulty records from processing and reported them to the Instrumentation Section. The editors then timed all acceptable records and identified the bounds for the following four mission segments in each flight: (1) takeoff and ascent; (2) maneuver; (3) descent, flare, and landing; and (4) steady state. During the first three mission segments, which comprised the transient parts of flight, the stick position traces showed no steady values from which they seemed to deviate, and the airspeed and altitude traces changed frequently. The criteria used to distinguish the mission segments in each flight were as follows: Mission Segment 1 (takeoff and ascent) included both the takeoff and the climb to the initial steady-flight altitude and the unsteady ascents to other steady-flight altitudes. Mission Segment 2 (maneuvering) consisted of those transient parts of flight whose characteristics differed from those of Mission Segments 1 and 3. During maneuvering, the normal acceleration trace was usually very active. In addition to the unsteady part of flare and landing, Mission Segment 3 (descent, flare, and landing) included the unsteady part of any descent, whether intended for a new steady-flight altitude or for landing. Mission Segment 4 (steady state) included those parts of the flight where the stick position traces were relatively steady and where the airspeed and altitude traces were steady or changing smoothly. Such characteristics prevailed during cruise, hover, and steady ascent and descent.

After demarcating the flights into mission segments, the editors marked the traces as follows to govern the data reading: The normal acceleration trace was marked wherever a peak met the following two conditions: (1) the peak fell outside prescribed threshold levels, and (2) the peak had a rise and fall (or fall and rise) that were each 50 percent of the peak value or 0.2g, whichever was greater. Whereas the prescribed thresholds were 0.8 and 1.2g, the editors used levels of 0.84 and 1.16g to ensure the inclusion of all valid peaks. However, any of the peaks read within the fixed threshold levels of 0.8 and 1.2g were eliminated during the computer processing. In addition, the editors identified each selected peak as being maneuver- or gust-induced. To determine whether a peak was induced by a maneuver or a gust, the editors noted the behavior of the stick position traces. Whenever the peak was the result of maneuvering, one or both of the stick traces would always deflect just before and in the same direction as the peak. However, ascertaining that a peak was gust induced was difficult because of the very high activity of the control sticks. Ascertaining that gust was the cause of the peak required either that both stick position traces were steady or that any

movement of these traces just before the peak was in the direction opposite to that of the peak.

Like the treatment of the normal acceleration trace, the editors marked the lateral and longitudinal acceleration traces wherever they peaked outside the prescribed thresholds of  $\pm$  0. lg. As before, to ensure inclusion of all valid peaks, the editors used levels of  $\pm$  0.097g. Again, any peaks read within the prescribed threshold of  $\pm$  0. lg were eliminated during the computer processing. These peaks were not identified as being maneuver- or gust-induced.

In treating the two stick position traces, the editors marked those peaks whose rise or fall was 10 percent of the full stick travel and at least 10 percent of the normal value. Each normal value depended on the mission segment. For the steady-state mission segment, the normal values were the steady values of the stick positions just before and after the peak. For the three transient mission segments (where no "steady" stick positions prevailed), an arbitrary set of normal values was chosen to approximate the stick positions during hover. The selected values are listed by aircraft serial number in Table I.

TABLE I. STICK POSITION SELECTED VALUES

Aircraft No.	Long. Cyclic Normal (%)	Collective Normal
145	61.32	50.25
149	51.77	50.72
154	61.77	56.03

In each of the three transient mission segments, all traces except those for the steady stick positions were marked at each instant that the acceleration or stick position traces peaked. Because of the unsteady state prevailing during the three transient mission segments, no elapsed time was associated with the readings at these markings. The traces marked here were read only to provide corresponding parameter values in tabulations of the peak values. During the steady-state mission segment, however, all traces except that for acceleration were marked at critical points to permit an adequate time-history representation of the parameters.

#### DATA READING AND QUALITY CONTROL

All data points selected during the editing were measured on semi-automatic oscillogram readers, and the measurements were transcribed directly to punched cards. When all data were extracted from a flight, a printout of the cards was given to the Quality Control Section for pre-liminary data checking. Using standard quality control techniques, this section manually remeasured random points comprising an adequate sample and compared the measurements with those produced by the semiautomatic readers. Then, from the differences between the two sets of readings, this section established the mean and standard deviations to determine and control the desired reading accuracy. Any of the flights whose measurements did not meet the accuracy standard were reread by the semiautomatic readers. In addition to obtaining accurate values, this procedure ensured a uniform interpretation and measurement of the traces.

When all data had been processed, the mean and standard deviations were calculated for the entire data sample. Assuming a normal distribution of reading errors, 99.7 percent of the readings should be within three standard deviations of the true values. Based on average calibration values, Table II shows the mean deviation and the three standard deviations for each parameter.

#### DATA COMPUTATIONS

The load factor  $n_Z$  for each normal acceleration peak was measured directly from the oscillogram trace. However, to present load factors for positive and negative peaks conveniently, an incremental normal load factor,  $\Delta n_Z$ , was derived from each  $n_Z$  value by using the relationship

$$\Delta n_z = n_z - 1.0$$

The following equation (see Reference 2) was used to compute density altitude, since this parameter is normally used in describing helicopter performance:

$$h_d = 145,300 \left[ 1 - \left( \frac{518.4 P_a}{29.92 (OAT + 460)} \right)^{0.235} \right]$$

Since the instrument installation correction to derive the calibrated airspeed was judged to be negligible, only indicated airspeeds were considered. For airspeeds below 110 knots, the correction is less than 4.6 knots; in addition, the correction depends on the thrust conditions of the rotor, such as those during hover and full power climb.

TABLE II.	QUALITY	CONTROL	VALUES				
	<del></del>			Th	ree St	andard	Deviation

Parameter	Mean Deviation	Three Standard Deviations (99.7% Accuracy Limit)
Longitudinal acceleration $n_X$ , g	0001	± .03
Lateral acceleration ny, g	0002	± .05
Normal acceleration nz, g	0001	± .03
Airspeed, knots*	07	± 3.6
Altitude, feet**	-1.2	± 62
Outside air temperature, °F	04	± 2.2
Rotor, rpm	08	± 4.0
Longitudinal cyclic stick, percent	14	± 1.5
Collective stick, percent	11	± 1.2

<sup>\*</sup> Computed at a 90-knot indicated airspeed

Rotor rpm and outside air temperature were computed by applying linear calibrations to the trace measurements. With the displacements of the stick position trace representing the deflections of the longitudinal cyclic stick from the full-forward position and the deflection of the collective stick from the full-down position, the respective stick positions were computed from the trace measurements in units of percent of full deflection. By an approximate differentiation of the altitude trace, the rate of climb was computed continuously during the steady-state mission segment and at each position of stick or acceleration peak during the three transient mission segments. At the same time that the rate of climb was computed, the "longitudinal acceleration," or rate of change of airspeed, was derived by an approximate differentiation of the airspeed trace.

<sup>\*\*</sup> Computed at a 1000-foot density altitude and standard temperature

Through the following expressions, the rotor tip speed ratio ( $\mu$ ) and the ratio of the thrust coefficient ( $C_T$ ) to the rotor solidity ( $\sigma$ ) were each calculated as nondimensional parameters. With a consistent system of units employed, the ratio  $\mu$  was calculated by

$$\mu = \frac{V}{\Omega R}$$

and the ratio  $C_{\mathrm{T}}/\sigma$  was calculated by

$$C_T/\sigma = \frac{W}{\rho \pi R^2 (\Omega R)^2 \sigma}$$

#### DATA RESULTS

The data representing the 207 hours of valid flight data are presented in the form of histograms, exceedance curves, and time and occurrence tables. Because of their volume, the figures and tables making up the data presentation are contained in the appendixes. The histograms present the percentage of time spent in ranges of the various parameters. The exceedance curves indicate the number of flight hours required to equal or exceed a given parameter value. With the exception of Table III, the time tables, Tables IV through VII, cover only the steady-state mission segment. The occurrence tables, Tables VIII through XLV, show the number of peaks of a given parameter falling within ranges of this parameter and those of a second parameter. Some of the occurrence tables are further related to the single range of a third parameter or to the single ranges of both a third and a fourth parameter.

Figures 2 through 13 are histograms showing the percentage of flight time spent in ranges of the various parameters. Figure 2 shows that more than one-half of the flight time occurred in the maneuver mission segment. This expenditure of time contrasts sharply with previous flight loads studies, where most of the flight time was recorded during steady-state conditions. Therefore, the armed CH-47A was considerably more active than the cargo and transport CH-47A reported in Reference 3. This greater activity will be evidenced further in the discussion of the normal acceleration peak values. The histograms in Figure 3 give the flight profile of the armed CH-47A.

Contained within a small range, the helicopter gross weights were over 30,000 pounds during more than 75 percent of the flight time. Because of the high elevation of the terrain in the operational area, more than 95 percent of the steady flight time was spent at density altitudes exceeding 2000 feet.

Figure 6, depicting rotor rpm under steady-state conditions, shows that only a few values slightly exceeded the range from 220 to 240 rpm. As evidenced in the oscillogram of Figure 19, the highest rpm of 246 was recorded in a rapid descent during a maneuver segment when the longitudinal cyclic control stick position was at 13 percent of full travel aft. This figure also shows that the rotor rpm during the preceding ascent had fallen below 220. Tables XIV and XX further evidence the low rpm's during this ascent; they list all peaks of the stick position trace within rpm ranges below 220. These tables give no times for the parameters, since they contain data recorded during the transient parts of flight.

Figure 7 shows the percentage of time at the recorded outside air temperatures. No temperatures below 50°F were recorded.

As shown in Figure 8, for the rate of climb during steady-state conditions, the rate of climb was within ± 500 feet per minute most of the time. For the rate of climb during the transient missions, the maximum descent rate was 5202 feet per minute, which occurred during a weapons pass; the maximum ascent rate was 4173 feet per minute.

Figures 9 through 13 distribute the steady-state flight time within combined ranges of airspeed, altitude, and gross weight. The highest airspeed in steady-state flight was 135 knots; the highest in transient flight was 161 knots, which occurred during the weapons pass delineated by the oscillogram traces in Figure 20.

The exceedance curves in Figures 14, 15, and 16 show the number of hours required to reach or exceed a given positive or negative incremental maneuver load factor. These figures represent the composite data and the data breakdowns by mission segment and gross weight range. The frequency and magnitude of the load factors are highest in the maneuver mission segment. Figure 21 shows the oscillogram with the largest recorded load factor (n<sub>z</sub> of 1.95). The corresponding airspeed was 100 knots and the gross weight was 28,027 pounds. Closely paralleling the data presented in the time tables, the curves for the weight range between 28,000 and 32,000 pounds and for the altitude range between 2000 and 5000 feet represent more than 70 percent of the nz's. As extracted from Reference 3, Figure 22 shows the maneuver spectrum for the cargo version of the CH-47A. Comparison of this figure with Figures 14 through 16 again shows that the flight loads imposed on the armed CH-47A's were considerably greater than those on the cargo helicopters. Through both a diagram and a tabulation, Figure 17 shows the maneuver normal load factor peaks falling in ranges of the rotor tip speed ratio, µ.

Figure 18 shows the exceedance plots for the positive and negative incremental gust load factors. The sparsity of the data points, due primarily to the difficulty of ascertaining gust-induced peaks with certainty, permitted only a composite presentation. A valid sample could not be derived through further breakdown of these data.

With a breakdown by gross weight range, Table III distributes the total flight time among the four mission segments. As mentioned above, the time tables in Tables IV through VII cover only the steady-state mission segment. Each of the latter tables consists of several subtables. The

heading of each subtable gives: first, the parameter whose ranges form the ordinate of the subtables; second, the parameter whose ranges form the abscissa; and third the parameter whose individual range follows immediately. Thus the times in minutes within the subtable proper give the periods spent within the three combined ranges.

Tables VIII through XXI list the number of observed peaks of either the longitudinal cyclic stick position or the collective stick position as a function of two other variables. Each table consists of several subtables. In each subtable, the ordinate gives the ranges of the peak values, and the abscissa, running immediately above the subtable proper, shows the ranges of the first related variable. Then the heading above each subtable abscissa is the individual range of the second related variable. The figures within the subtable proper represent the number of peaks in the given ordinate ranges along with the corresponding ranges of the two related variables. For example, in each subtable of Table VIII, the ordinate gives the ranges for the longitudinal cyclic stick position peaks, the abscissa gives the ranges for the steady longitudinal cyclic stick position values just before the peak occurrence, and the heading gives the range of the simultaneous steady collective stick position values. Those tables with the steady stick value as the abscissa represent the steady-state mission segment and also include the time spent in the various ranges of the steady stick values. No times are given for the tables representing the ascent, descent, or maneuver mission segments.

In Tables XXII through XXXIII, the number of observed peaks of normal acceleration, n<sub>Z</sub>, are listed as functions of up to four related variables. As in Tables VIII through XXI, the ordinates in the subtables give the ranges of the peak values, the abscissas give the ranges of the first related parameter, and the subtable headings give the individual ranges of the other related parameters. Of these tables, Tables XXII through XXVII represent gust-induced peaks; and Tables XXVIII through XXXIII, maneuver-induced peaks. Similarly, Tables XXXIV through XXXVIII and Tables XXXIX through XLJII, respectively, list the number of observed peaks of the longitudinal acceleration, n<sub>X</sub>, and the lateral acceleration, n<sub>Y</sub>. In Tables XLIV and XLV, the normal acceleration peaks are cross referenced with the corresponding values of longitudinal acceleration and lateral acceleration, respectively.

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- 2. von Mises, Richard, <u>Theory of Flight</u>, McGraw-Hill Book Company, Inc., New York, 1945, p. 11.
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  <u>Loads Investigation Program</u>, USAAVLABS Technical Report 66-68,
  July 1966.

### APPENDIX I ILLUSTRATIONS FOR DATA PRESENTATIONS

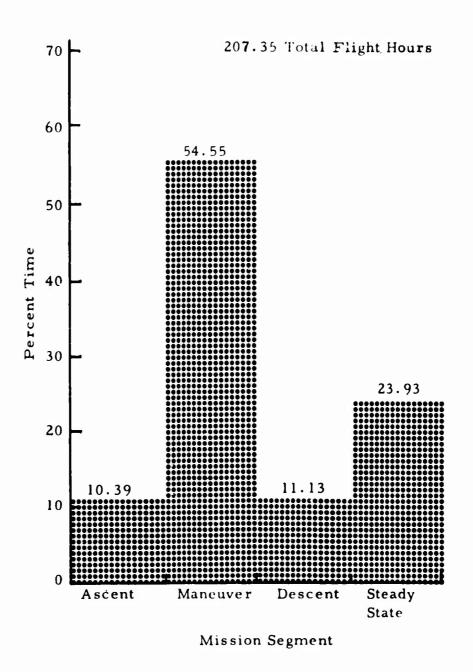


Figure 2. Percentage of Total Flight Time in Each Mission Segment

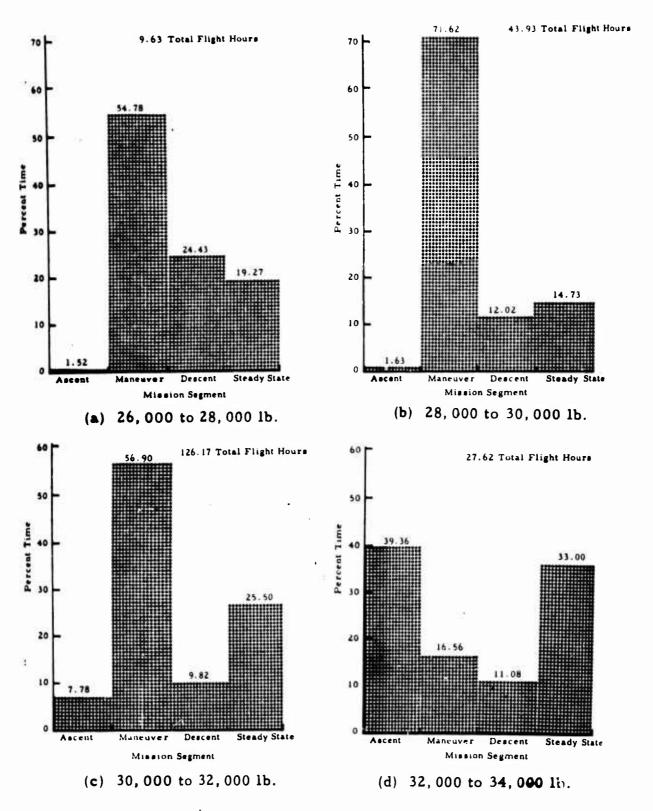


Figure 3. Flight Time in Each Gross Weight Range Broken Down by Percentage of Time in Each Mission Segment

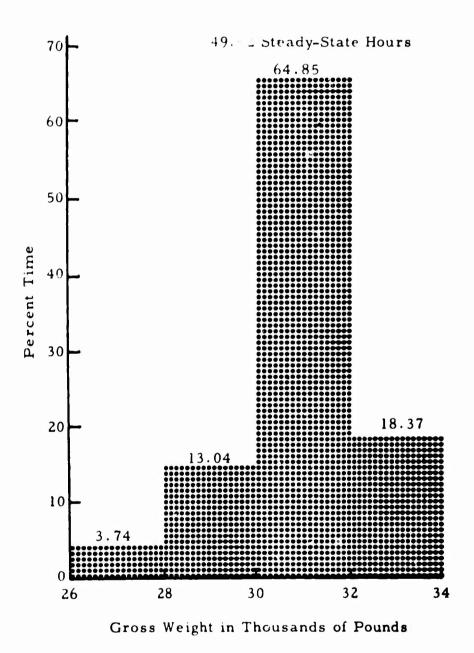


Figure 4. Percentage of Steady-State Mission Segment Flight Time in Each Gross Weight Range

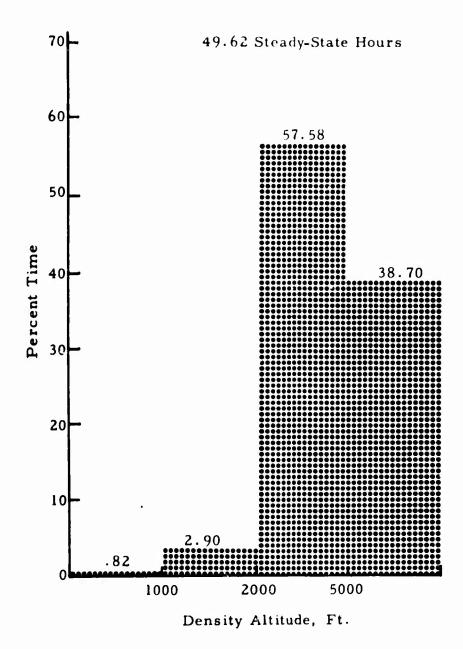


Figure 5. Percentage of Steady-State Mission Segment Flight Time in Dach Density Altitude Range

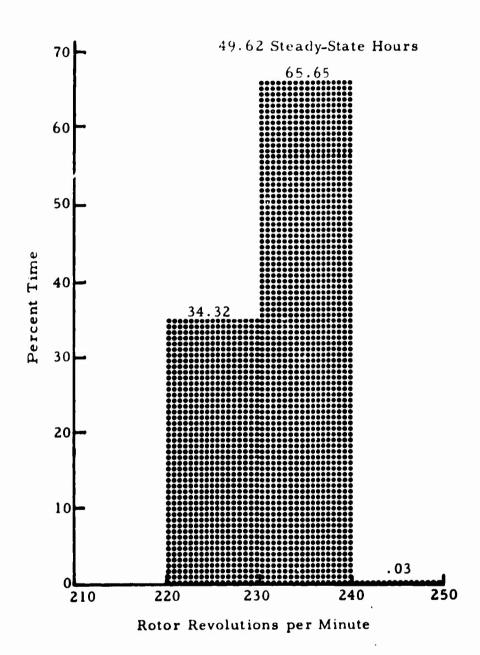


Figure 6. Percentage of Steady-State Mission Segment Flight Time in Each Rotor RPM Range

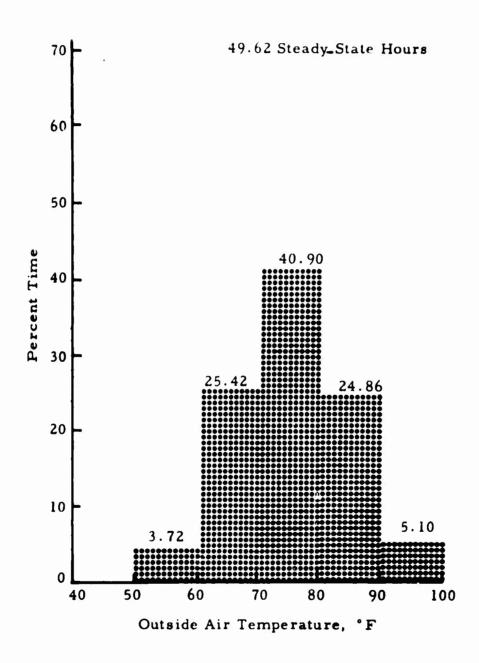


Figure 7. Percentage of Steady-State Mission Segment Flight Time in Each Outside Air Temperature Range

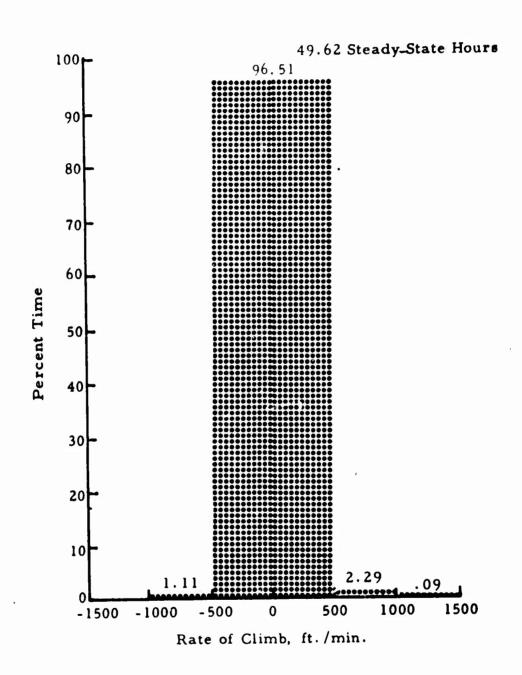


Figure 8. Percentage of Steady-State Mission Segment Flight
Time in Each Rate of Climb Range

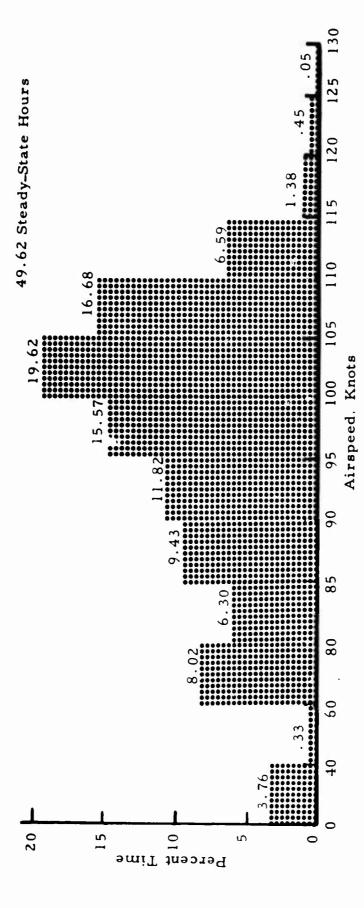
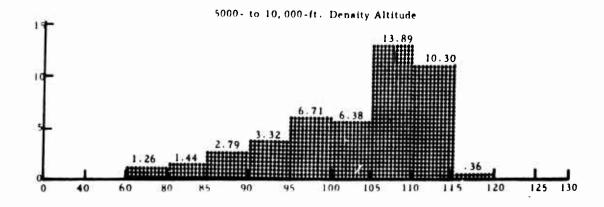
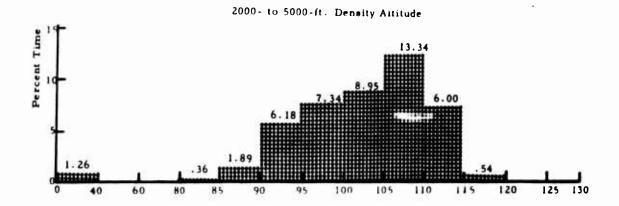


Figure 9. Percentage of Steady-State Mission Segment Flight Time in Each Airspeed Range





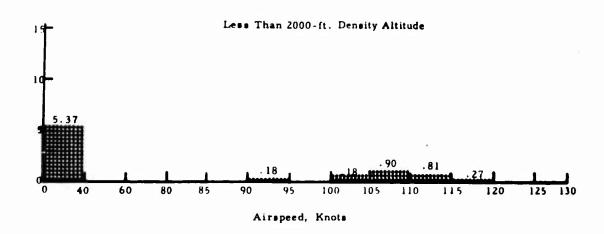
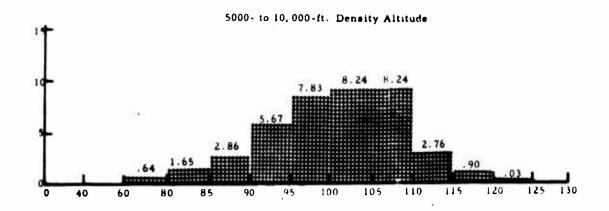
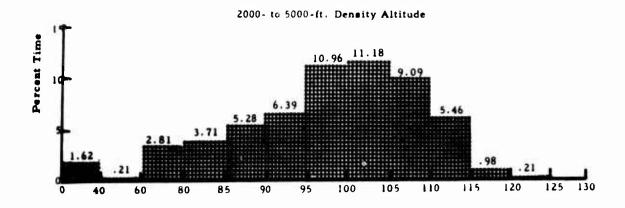


Figure 10. Time in Steady-State Mission Segment in 26,000 to 28,000-Pound Gross Weight Range Broken Down by Percentage of Time in End Density Altitude-Airspeed Range





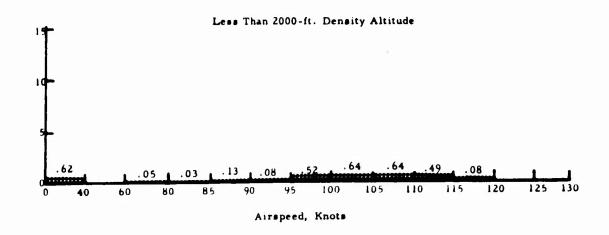
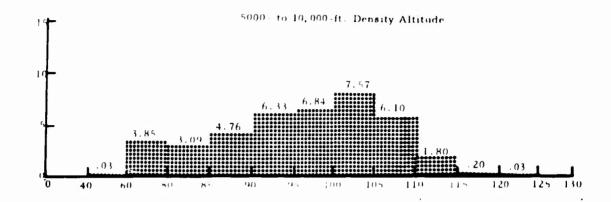
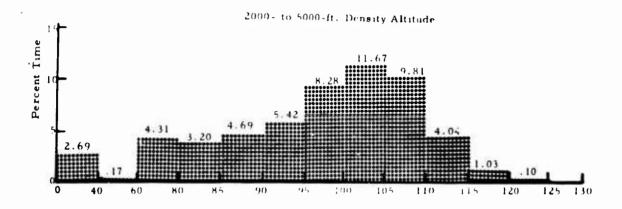


Figure 11. Time in Steady-State Mission Segment in 28,000 to 30,000-Pound Gross Weight Range Broken Down by Percentage of Time in Each Density Altitude-Airspeed Range





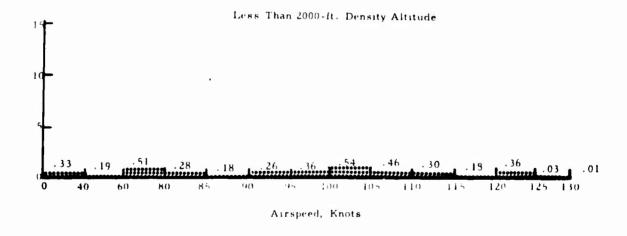
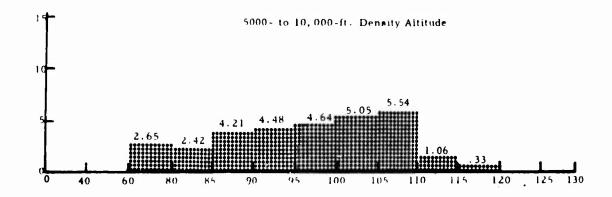
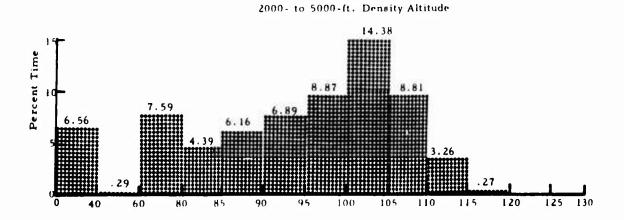


Figure 12. Time in Steady-State Mission Segment in 30,000 to 32,000-Pound Gross Weight Range Broken Down by Percentage of Time in Each Density Altitude-Airspeed Range





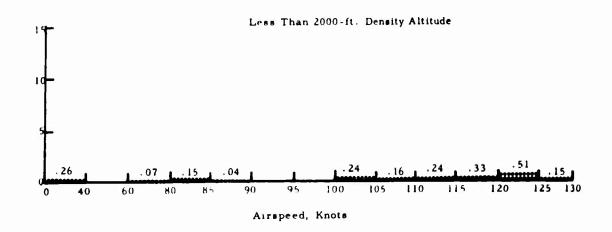


Figure 13. Time in Steady-State Mission Segment in 32,000 to 34,000-Pound Gross Weight Range Broken Down by Percentage of Time in Each Density Altitude-Airspeed Range

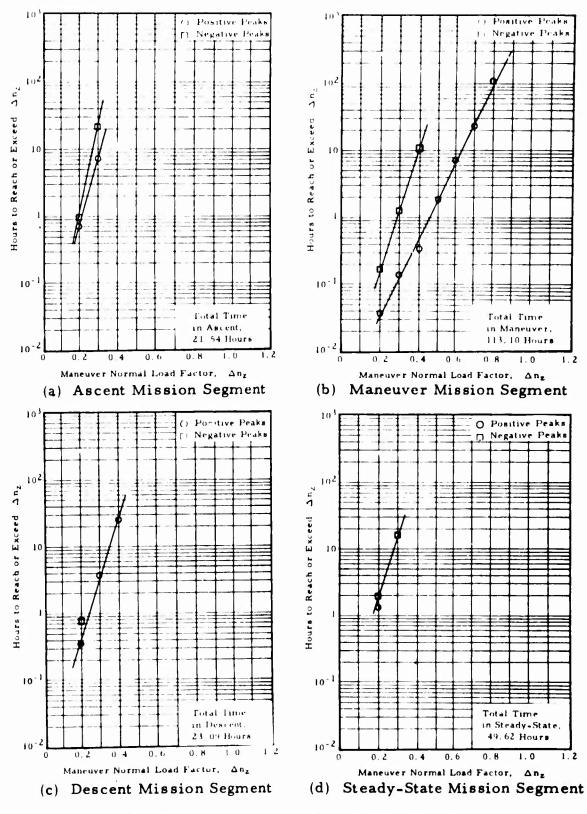


Figure 14. Exceedance Curves for Incremental Maneuver
Normal Load Factor Peaks by Mission Segment

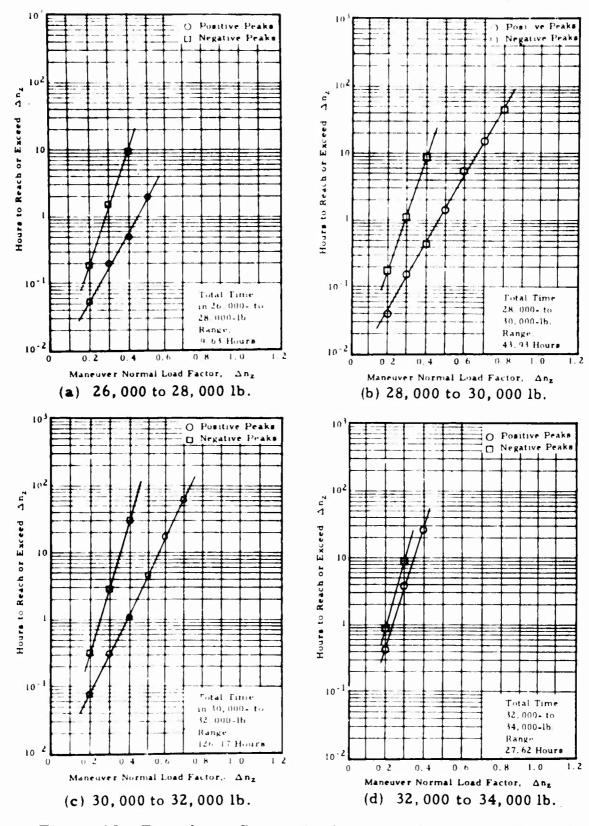


Figure 15. Exceedance Curves for Incremental Maneuver Normal Load Factor Peaks by Gross Weight Ranges

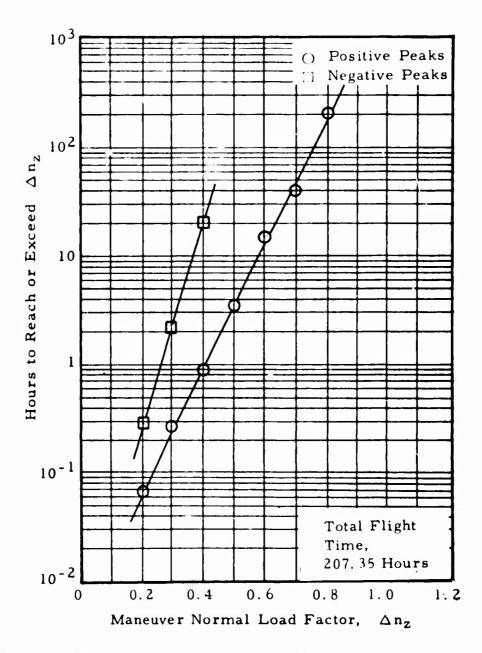
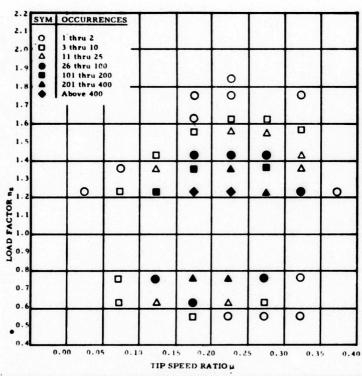


Figure 16. Exceedance Curves for the Composite of Incremental Maneuver Normal Load Factor Peaks



				Tip Sp	eed Ratio	ш				
Load Factor n <sub>z</sub>	Less Than 0.00	0.00 to 0.05	0.05 to 0.10	0.10 to 0.15	0.15 to 0.20	0.20 to 0.25	0.25 to 0.30	0.30 to 0.35	0.35 to 0.40	Total
2.2 to 2.4										
2.0 to 2.2										
1.8 to 2.0						1				1
1.7 to 1.8					1	2		1		4
1.6 to 1.7					1	5	4			10
1.5 to 1.6					6	14	19	6		43
1.4 to 1.5		itira.		4	32	63	58	13		170
1.3 to 1.4			1.	. 25	166	208	139	20		559
1.2 to 1.3		2	10	157	862	909	255	30	1	2226
0.8 to 1.2										
0.7 to 0.8			9	77	261	223	58	2		630
0.6 to 0.7			+	13	38	18	+			77
0.5 to 0.6					7	1	1	1		10
Total		2	24	276	1374	1444	538	73	1	3732

Figure 17. Diagram and Tabulation of Maneuver Normal Load
Factor Peaks in Ranges of Rotor Tip Speed Ratio

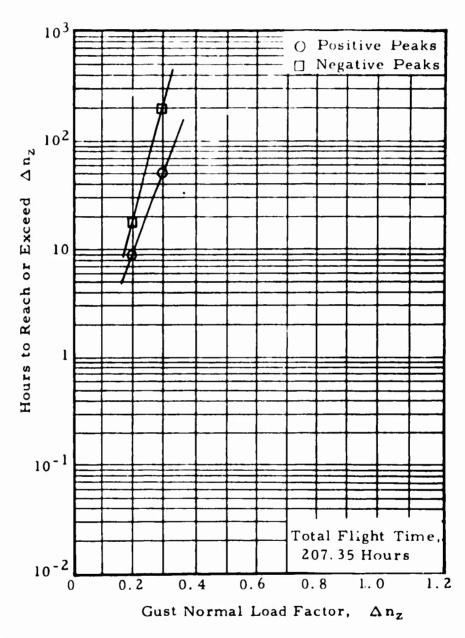


Figure 18. Exceedance Curves for Composite of Incremental Gust Normal Load Factor Peaks

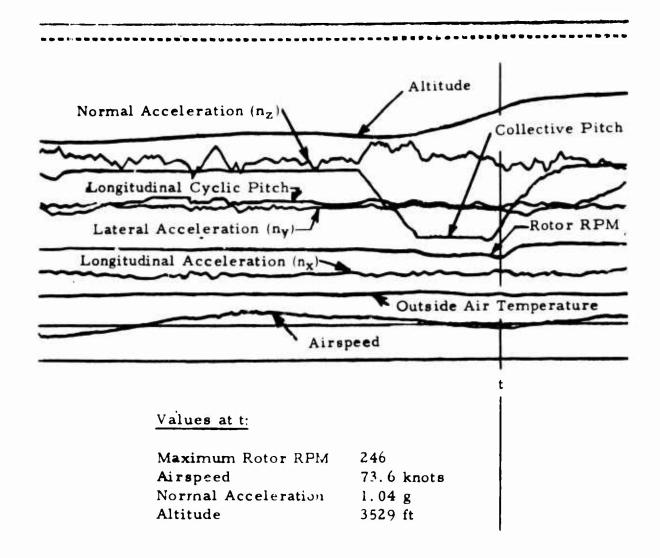


Figure 19. Maximum Rotor RPM Condition

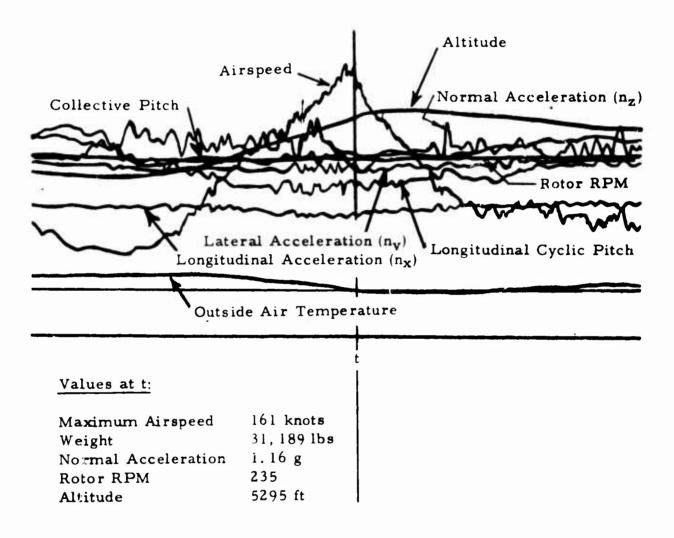


Figure 20. Maximum Airspeed Condition

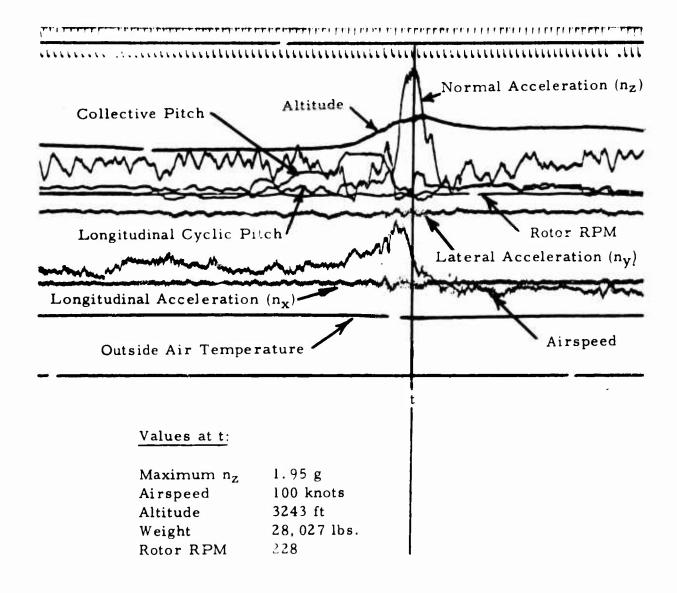


Figure 21. Maximum Normal Acceleration Condition

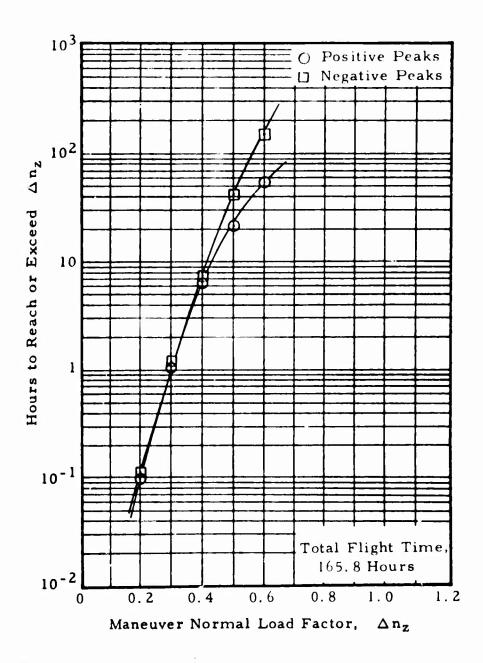


Figure 22. Plot of Maneuver Load Factor from Reference 3
Reflecting the Maneuver Spectrum for the Cargo
Version of the CH-47A

#### APPENDIX II

#### TABLES FOR DATA PRESENTATION

Tables III through XLV are computer printouts.

All times in these tables were rounded off to the nearest tenth of a minute. Total times, as well as individual times, are accurate to within 0.05 minute, since the individual times comprising the respective totals were summed before the totals were rounded off. However, the addition of some printed individual times may differ from the corresponding printed total time by some fraction of a minute. Any time between 0 and up to but not including 0.05 minute was printed as "0.0," and no time measured was printed as "0." Tables having no points or time were not printed.

Table headings are arranged so that the first-mentioned parameter refers to the vertical ranges at the left of the table; the second-mentioned parameter refers to the horizontal ranges at the top of the table; where a third or fourth parameter is mentioned, it followed by its range in the heading. As an example, the heading "NZ GUST PEAKS VS VEL. BY MISS. SEG. ASCENT, ALT. LESS, WGT. 30000" indicates the number of gust nz peaks in selected airspeed ranges for ascent, altitude below 1000 feet, and weight between 30,000 and 32,000 pounds.

With the exception of the code "LESS," the code for each range gives its lower limit. The following listing gives the range codes for all parameters:

		Gus	t n <sub>z</sub> and	n <sub>x</sub>	and n <sub>V</sub> (g)
Airspe	ed (knots)	Maneu	$ver n_{Z}(g)$		
Code	Range	Code	Range	Code	Range
Less	Below 40	Less	Below 0.2	Less	Below -0.40
40	40 to 60	0.2	0.2 to 0.4	-0.40	-0.40 to -0.35
60	60 to 80	0.4	0.4 to 0.5	-0.35	-0.35 to -0.30
80	80 to 85	0.5	0.5 to 0.6	-0.30	-0.30 to -0.25
85	85 to 90	0.6	0.6 to 0.7	-0.25	-0.25 to -0.20
	90 to 95	0.7	0.7 to 0.8	-0.20	-0.20 to -0.15
90	95 to 100	0.8	0.8 to 1.2	-0.15	-0.15 to -0.10
95	100 to 105	1.2	1.2 to 1.3	-0.10	-0. 10 to 0. 10
100		1.3	1.3 to 1.4	0.10	0.10 to 0.15
105	105 to 110	1.4	1.4 to 1.5	0.15	0.15 to 0.20
110	110 to 115		1.5 to 1.6	0.20	0.20 to 0.25
115	115 to 120	1.5		0.25	0.25 to 0.30
120	120 to 125	1.6	1.6 to 1.7	0.30	0.30 to 0.35
125	125 to 130	1.7	1.7 to 1.8		
130	130 to 135	1.8	1.8 to 2.0	0.35	0.35 to 0.40
135	135 to 140	2.0	2.0 to 2.2	0.40	Above 0.40
140	Above 140	2.2	2.2 to 2.4		
140		2.4	Above 2.4		

	of Climb t/min) Range	Stick Code	Peaks (%) Range		ive & Cyclic  Steady (%)  Range Below 10
Less	Below -2500	Less	Below -40	10	10 to 20
-2500	-2500 to -2000	-40	-40 to -30	20	20 to 30
-2000	-2000 to -1500	-30	-30 to -20		
-1500	-1500 to -1000	-20	-20 to -10	30	30 to 40
-1000	-1000 to -500	-10	-10 to 10	40	40 to 50
-500	-500 to 500	10	10 to 20	50	50 to 60
500	500 to 1000	20	20 to 30	60	60 to 70
	1000 to 1500	30	30 to 40	70	70 to 80
1000	1500 to 2000	40	Above 40	80	80 to 90
1500	1500 00			90	Above 90
2000	2000 to 2500				
2500	Above 2500				

Tip Sp	eed Ratio	<u>W</u> e	ight (pounds)
$\underline{Code}$	Range	Code	Range
Less	Below 0.00	Less	Below 20, 000
0.00	0.00 to 0.05	20,000	20,000 to 22,000
0.05	0.05 to 0.10	22,000	22,000 to 24,000
0.10	0.10 to 0.15	24,000	24,000 to 26,000
0.15	0.15 to 0.20	26,000	26,000 to 28,000
0.20	0.20 to 0.25	28,000	28,000 to 30,000
0.25	0.25 to 0.30	30,000	30,000 to 32,000
0.30	0.30 to 0.35	32,000	Above 32,000
0.35	Above 0.35		

		A1	ltitude (feet)	Thrus	st Coefficient
Rote	or RPM	Code	Range	1 111 43	Ratio
Code	Range	Less	Below 1000	Code	Range
Less	Below 210	1000	1000 to 2000	Less	Below 0.06
210	210 to 220	2000	2000 to 5000		0.06 to 0.09
220	220 to 230	5000	5000 to 10,000		0. 09 to 0. 12
230	230 to 240	10,000	10,000 to 15,000		0. 12 to 0. 15
240	240 to 250	15,000	15,000 to 20,000		Above 0. 15
250	Above 250	20,000	Above 20,000	0.15	ADOVE 0.13

	ide Air rature (°F)_		d Acceleration t/sec <sup>2</sup> )
Code	Range	Code	Range
Less	Below 0	Less	Below -15
0	0 to 10	-15	-15 to -12
10	10 to 20	-12	-12 to -9
20	20 to 30	<b>-</b> 9	-9 to -6
30	30 to 40	-6	-6 to -3
40	40 to 50	-3	-3 to 3
50	50 to 60	3	3 to 6
60	60 to 70	6	6 to 9
70	70 to 80	9	9 to 12
80	80 to 90	12	Above 12
90	Above 90		

TABLE III
FLIGHT TIME FOR MISSION SEGMENT VERSUS WEIGHT

i r	[Mt (M] 4	u1:51 F	i,n #15	\$ 10N - \$E	GHENT V	IS WELGI	41	TOTAL		
ASCENT MANUAR DESCRI STEADY TOTAL	LESS	10006	\$5.103	24000	9.8 316.5 141.7 111.1	18#7.5 316.7 3#8.3	588.4 4107.8 743.4 1930.7	457.1	107AL 1297.4 6786.2 1385.1 2977.2 12440.8	TOTAL(HOURS) 21 5 114 1 23 † 49 6 207 3

TABLE IV
STEADY-STATE TIME FOR ALTITUDE VERSUS
AIRSPEED BY WEIGHT

	INFINIT	IESI FO		ODE 43													
ESS	LESS	•0	60	90	85	90	95	1 20	105	110	115	120	125	1 30	135	140	TOTAL 6.0
000						0.2		0.2	1.0	0.9	0.3						2.5
000	1.4			0.4	2 • 1	A. 9	8.2	10.0	14.9	6.7	0.6						51.1
3000 3000 3000			1.4	1.6	. 3.1	3. 7	7.5	7.1	15.5	11.5	0.4						51.7
TAL	1.4		1+4	2.0	5.2	13.8	15.7	17.3	31.4	19.0	1.3						111.)
,	INE (MINU	TEST FI	ALTE	rupe vs	VE LOC E	TY BY W	F I GHT 21	020									
	Less	40	60	60	85	90	95	100	105	110	115	120	125	130	135	140	TOTAL
LESS	U. 6		3.1		C. 5		2.0	2.5	2.5	1.9	0.3						11.4
1000	1.8		9.1	0.1	70.4	0.3 24.8	42.6	43.4	15.3	21.2	3.6	0.0					224.1
000	6. 1	0.0	2.5	14.4	11.1	77.0	30.4	32.0	12.0	10.7	3.5	0.1					150.
300 300 300 300						77.0	,,,,	,	7.00		24						
CODGI	4.6	J. 6	11,6	20.9	12.2	47.1	75.C	77.9	49.8	33.8	7.6	0.8					300.
LESS 1000 2000 5000		40 2.4 0.9 3.3 0.5	60 4.2 5.7 83.3 74.3	80 0.6 4.8 61.7 59.7	05 0.5 3.3 90.5 91.9	90 1.4 3.6 104.6 172.2	95 C. 9 6. 1 157. 8 137. 1	100 1.4 9.1 275.2 146.0	105 1.0 7.9 189.2 117.7	110 5.7 78.0 34.8	115 3.5 19.9 3.8	120 7.0 2.0 0.6	0.6	0.2	135	140	1014 17. 60. 1069. 783.
5030 0033 01AL	,																
O D D A L	SWE CHING	ITES) F	OR ALTE	TUDE VS	AEFUC E	TV RY W		≥ 300	-			•					
0000 DTAL		ITES) F	09 ALTE	TUDE VS	VELTIC E			100 2 Joo	105	110	115	170	125	130		140	TOTA
0000 TAL	SME (MINU					TY 87 W	EIGHT 3		105 0.•	110	115 1.0		125	130		140	11.
1000 TAL	THE I MING		60 J.4	0.8 24.0	85	TY 87 W	EIGHT 3	100	0.9	1.3		1 20		130		140	11.
ESS 1000 1000 1000 1000	EESS 1.4	40	•0	80 0.8	#5 C+2	TY RY W	EEGHT 3	100	0.9	1.3	1.0	1 20		130		140	
TAL	EESS 1.4	40	40 3.4 41.5	0.8 24.0	0.2 33.7	TY BY W 90 37.7	95 48.5	100 1.3	0.9	1.3	1.0	1 20		130		140	11.

TABLE IV - contd.

,	ME   M   M	UTESI F	CR ALTI	TUDE VS	VELOC I	TY #Y W	EIGHT T	DTAL								
LESS 1000 2030 5000 10000	10.4 3.3 93.6	4C 2.8 0.5 3.8 0.5	60 4.3 6.2 135.7 92.7	90 0.6 5.8 100.5 80.9	45 1.0 3.3 144.8 124.2		95 C.9 8.0 259.1 195.5	100 1.4 13.1 357.1 212.7	105 1.0 12.3 287.6 195.5	9, ' 123, 7 62, 8	4.0 25.7 9.5	9.8 2.8 0.7	125	0.2	135	140 TOTAL 24.4 86.2 1714.4 1152.3
1C1 PF	111.0	10.0	230.9	107.7	200.7	351.9	463.5	584.3	494.5	196.	41.2	13.3	1.4	0.2		2977.2

TABLE V
STEADY-STATE TIME FOR COLLECTIVE STICK POSITION VERSUS
CYCLIC STICK POSITION BY RATE OF CLIMB

	TIME (MING	ITEST FC	COLL	. 2 ( 1 1 4 6	. 43 (10							
LESS 10 20		10	20	30	• • •	50	•0	70	•0	90	TOTAL	
46 50 60 70						0.1					0.1.	
TCTAL						0.1					0.1	
•	IME (MINUT	ESI FUR	COLLE	CTIVE	VS CYCL	IC OV CL	.148 -1	000				
	LESS	10	20	10	40	50	60	70	80	90	TOTAL	
LESS 1C 20 3C	,		••									
4 C				1.3		1.0		0.1			11.0	
5C 60 70 8C				0.2	1C.6 C.3	3.5	C.3	0.1			1.4	
TETAL				4.0	19.7	1.5	0.7	0.2			33.1	
	146 ( #1401		COLL	FCTIVE	WS CYCL	1C AY C	LIMA -	- 500				
•	LESS	ic	20	30		50	60	70	40	20	TOTAL	
LE 5 5	LUSS	10	20	•0		,,,		,,	7,	••		
\$C						0.5					0.5	
30				10.1	440.3	1.7 217.8	0.1	0.6			7.7 695.F	
4C				136.5	1142.1	668.0	49.3	0			1999.0	
60				41.0	94.9	65.7	10.4	0.6			174.7	
70 AC				C. 9	C . 2						1.1	
90								2.0			2473.3	

TABLE V - contd.

		10	20	30	40	50	60	70	80	90	TOTAL
	LESS	10	20	,,,	40	,,					
											2.2
				1.5	1.1	17.5		0.2			54.6
				1.0	7.6	1.0	0.7				11.0
											68.0
				2.5	44.2	20.4	C.7	0.2			04.0
TI	MECHINU	TESI FO	e COLL	ECTIVE	A2 CACI	IC BY C	LIMB	1000			
5	LESS	10	20	30	40	50	60	70	80	90	TOTA
:											
											1.
0				0.2	1.0	0.1					i.
0											
0											
ĭ				0.2	2.2	G. 2					2.
TI	ME (MINU	TES) FC	e COLL	ECTIVE	vs cycl	IC BY C	LIMB TO	TAL			
	LESS	10	20	30	40	50	60	70		90	TOTAL
:						0.5					2.
				11.4	450.3	240.5	6.9	0.7			709.
				142.0	1189.4	692.2	49.7	1.1			2075.
				44.2	64.0	68.1	11.5	0.6			100.

TABLE VI STEADY-STATE TIME FOR ROTOR RPM VERSUS RATE OF CLIMB BY OUTSIDE AIR TEMPERATURE

11	MEIMIN	UTES) F	OR RPH	AZ CFI	MB 84 T	EMPERATU	RE	50				
LESS	LESS	-2500	-2000	-1500	-1000	-500	500	1000	1500	2000	2500	TOTAL
510						35.5	0.9					36.3
230 240 250					1.0	70.5	3.C					74.5
TCTAL					1.0	106.0	3.0					110.5

### TABLE VI - contd.

	1145(414			ws (1		TEMPERA		60				
LESS	LESS	-250C	-5000	-1500	-100	0 -500	500	1000	1500	2000	2500	TOTAL
210												235.1
230				0.1	1 1.	0 509.4	5.6	0.1				521.1
250						C. 5						0.6
TOTAL				0.1	7.	4 719.7	9.4	0.2				756.8
	T I ME (MIN	utes) f	CR RP4	vs cı	IMB PY	TEMPERA	TURE	70				
	LESS	-2500	-2000	-1500	-1000	-500	500	1000	1500	2000	2500	-
LESS										2000	. , ,	
550					2.0	421.7	6.9	0.8				431.7
230					12.	760.3	12.5	0.5				786.0
250												0.1
TCTAL					15.0	11*2.1	19.4	1.3				1217.0
	TIME (MINI	TEC 1 E		uc cı		TEMPERAT						
							OM E	40				
LESS	LESS	-2500	-2000	-1500	-1000		500	1000	1500	2000	2500	TOTAL
530					6.1	228.0 475.8	17.8	0.2				239.9
24C					•••	0.1		0.4				500.1
TCTAL					•.5	703.9	27.0	0.6				740.0
	I ME (MINU	TES) FO		VS CLI	<b>#8 P</b> Y T	FPPERATU	<b>R</b> E	70				
		-2500		-1500	-100	-500	500	1000	1500	2000	2500	TOTAL
LESS		. ,00										
510					1.0	72.1	5.6	0.2				78.9
233					C. 5	69.7	2.0	0.3				73.0
240												
TCTAL					1.2	141.7	8.4	0.5				151.8
,	IME (MINU	TEST FO		VS CLI	MR RY 1	TEPPERATU	ME TO	TAL				
	LESS	-250C	-2000	-1500	-1000	-500	500	1000	1500	2000	2500	TOTAL
LESS												
230 230 240				0.1		986.9 1885.6 0.8	26.3	1.3				1021.9 1954.6 0.8
TOTAL				0.1	33.1	2673.3	68.0	2.7				2977.2

### TABLE VII STEADY-STATE TIME FOR $C_{\mathbf{T}}/\sigma$ VERSUS $\mu$ BY RATE OF CLIMB

	TIME(M	INUTESI	FOR CT	S VER	sus #u	87	CLIMA .	-1500		
LES		s 0.0c	0.05	0.10	0.15	0.20	0.25	0. 10	0. 35	TOTAL
0.C	?					C- 1				0.1
TCTA						G. 1				0.1
	TIME(M	INUTESI						-1000		
0.0	5	s 0.0C	0.05	0.10	0.15	0.20	0.25	0.30	2. 35	
0.1	5	0.7	0.3		3.0		C.1			31.
,,,,,		0.7	0.1		3.2	19.9	9.0			33.1
	T I ME ( M I	NUTES) F	V12 PD	S VERS	us #u	8¥ C	L1#8	-500		
LESS 0.06 0.09	LESS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0. 15	TOTAL
0.12	4.2		0.7	0.6	e-1	27.8	6.6			53.5
TOTAL	27.0	71.6	12.4	13.1	392.3	1724.3	632.3	0.2		2019.0 2073.3
	1 ME ( M )	NUTES) F	DR CT/S	VERSL	is mu	AV CL	. IMA	500		
LESS 0.06 0.09	LESS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	TOTAL
0.12	0.1	0.4		0.5	C. 2	0.5	11.3			0.7
TCTAL	0.1	0.4		0.5	22.1	13.6	11.3			67.3
•	IME (MIN	UTES) FO	e ct/s	VERSU	s mu	87 CL	188 1	000		
LESS 0.06 0.09	LESS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	TOTAL
0.12 0.15 TCTAL					1.4	0.6	0.5			2.7
ICIAL					1.4	0.8	0.5			2.7
711	4E (#[NU	TES) FC	CT/S	VERSUS	<b>₽</b> U (	NY CLIP	e tota	ıL		
ESS	LESS	3.00	0.05 0	.10	.15	0.20	.25	. 30	0.35 TO	TAL
.06 ESS										
-12	4.2	67.5	11.9	3.0 41	0.6 17	49.4 64	6.7	0.2	24	35.4
CTAL	27.1	72.5	12.7	3.6 41	9.1 17	78.7 65	3.1	0.2	29	77.2

TABLE VIII
CYCLIC STICK PEAKS VERSUS CYCLIC STICK
STEADY BY COLLECTIVE STICK STEADY

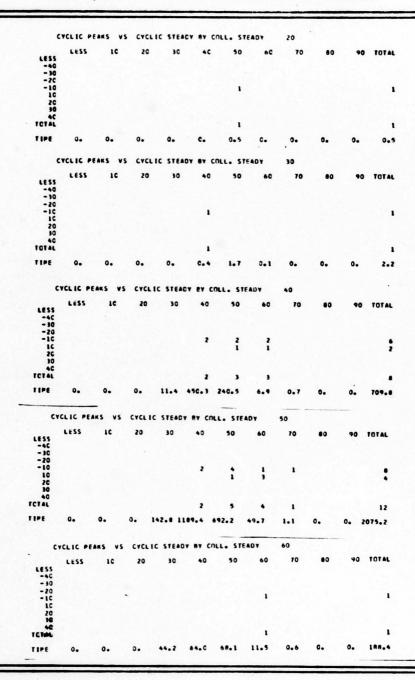


TABLE IX
CYCLIC STICK PEAKS VERSUS CYCLIC STICK
STEADY BY DENSITY ALTITUDE

	CACFIC &	EAKS VS	CACF	IC STEACY	. 44	ALT	TTUDE	LESS			
LES -4 -3	0	rc	20	30	40	50	60	70	40	•0	TOTAL
-1 1 2					,	ł	1				;
101					2	2	,				,
TIPE	0.	0.	0.	٥.	4.1	10.3	4.2	0.6	о.	•	24.4
	CYCLIC P	EAKS VS	CACF	IC STEADY	, 84	ALT	TTUCE	1000			
LES -4 -3	LESS IS	10	20	30	40	50	60	70	•0	•0	TOTAL
-1 1 2	C C C										,
TIPE		0.	0.	٥.	41.0	**.*	0.3	0.	0.	0.	04.2
	CYCLIC PE	AKS VS	CACFI	C STEACY	RY	ALTI	TUDE 2	000			
LESS -40 -30		10	20	30	<b>40</b>	50	60	70	•0	••	TOTAL
-20 -10 10 20					,	5	3	•			11
TCTAL					,		•	ı			19
TIPE	0.	0.	0.	143.1 100	1.0	479.8	20.5	1.9	0.	0. 1	714.4

TABLE X
CYCLIC STICK PEAKS VERSUS CYCLIC STICK
STEADY BY AIRSPEED

C	CLIC PE	AKS VS	CACFI	C STEACY		AELOC	ITY L	ESS			
LESS -4C -30	LESS	10	sc	30	40	50	60	70	•0	90	TOTAL
-20 -10 10 20					٠	. 2	:	1			15
TCTAL					•	•	•	1			21
TIPE	0.	0.	0.	0.1	10.0	67.6	22.9	2.5	0.	0.	111.9

TABLE X - contd.

	CACFIC SE	BW2 A2	CACFI	C STEADY	r BY	VELOC	ł T Y	40			
LESS -40		16	70	10	40	50	6.0	70	80	10	1011
-20 -10 10 20						i,					
TCTAL						1					
1106	0.	0.	J.	0.2	*.6	6. 1	c.	Ú.	r.	0.	10.
	CYCLIC PE	AKS VS	CACFI	C STEARN	, 14	VELOC		100			
LESS -40 -30	1155	AKS VS	SO CACF I	C STEARY	r 71¥	VELOC 50	6C	100 70	43	<b>3</b> 0	101
-40 -30 -20 -10	1157 3 C C C C								ь	Þg	1017
-30 -30	L:53				<b>4</b> 0				AJ	•0	<b>T</b> () <b>T</b> ()

TABLE XI
CYCLIC STICK PEAKS VERSUS CYCLIC STICK
STEADY BY ROTOR RPM

	CYCLIC P	EARS V	. CYCL	TC STEAM	CV AY	, .	I M	223			
LESS -40 -30		ıc	20	40	40	49	40	16	ηn	4(	TOTAL
-20 -10 10					1	1	1	1			1
TETAL	3				ı	٨	1	1			9
TIPE	0.	0.	υ.	101.7	554.7	156.1	1.4	1.1	c.	9.	1071.9
c	. VCL 1C PF	AKS VS	CYCLI	C STEADY	, RY	<b>#</b> P		217			
LESS -40 -30	LESS	10	20	13	47	50	<b>AC</b>	10	60	90	TOYAL
-20 -10 10 20					•	? 1	3				5
TCTAL					4	3	1				14
TIPE	0.	٥.	١.	97.6 11	48.6	646.1	60.7	1.6	0.	0.	1954.6

TABLE XI - contd.

	CYCLIC P	FARS VS	CACI	IC STEAM	v 4 v		r <b>m</b> "	) TAL			
LES	s c	10	20	10	4.2	10	AC	10	90	•0	TOTAL
- 9: -2: -1: 1: 2:	0 C C				•	,	:	1			17
3° 4°	C					7	•	1			21
TIPE	0.	٥.	0.	144.1 1	104.1	1007.9	64.2	2.5	0.	0.	2977.7

# TABLE XII CYCLIC STICK PEAKS VERSUS AIRSPEED ACCELERATION BY MISSION SEGMENT

LESS	LESS	-15.C	-12.0	-9.0	0	- 3. 0	3 . C	4.0	4.0	17.0	15.0	TOTAL
-40												
- 10					1	2						3
- 20					;	150	,	7				156
-10					i	127		i				1 35
ič					•	36	,	•				39
20						-						•
10												
40												
TCTAL					•	317	9	3				311
c	YCLIC F	FAKS VS	S ACCELS	PAT ION	8Y P155	104 SEG!	IENT PA	4UVR				
	LESS	-15.C	-17.0	-9.0	-6.0	- 3.	5 C	A. 0	9.0	17.0	15.0	TOTAL
LESS					_	_						
- + C						3						4
- 3C				3	6	115	29	. 6				[59 [393
- 20			1	. 1	34	1216	104	24	3			747
-10			ı	11	5.6	519	46	11				663
10			9	12	";	10	- ''	•				29
10 5C				•	í		•					i
40	•				•							•
TETAL			•	39	107	2510	556	43	3			3015
TCTAL	VCL1C PI	FAKS VS	5 ACCELER						3			3015
CY LESS		FARS VS -15.C							9.0	12.0	15.0	3015 TOTAL
CY LESS -4C			<b>PCCELER</b>	ATION R	v #155!	CN SEGN! -1.0	NT CES	. NT		17.0	15.0	₹∏₹≜L
CY LESS -4C -3C			<b>PCCELER</b>	ATION R	-e.c	CN SEGN! - 1.0 73	NT CES	. NT		17.0	15.0	TOTAL 73
CY LESS -4C -1C -20			<b>PCCELER</b>	ATION R	-e.c -	CN SEGME - 1.0 73 507	3. C	. NT		17.0	15.0	707AL 73 591
CY LESS -4C -3C -70 -10			<b>PCCELER</b>	ATION R	* #155! -e.c 3	CN SEGME - 1.0 73 587 142	3. C	. NT		17.0	15.0	707 AL 73 591 148
CV LESS -4C -1C -70 +1C			<b>PCCELER</b>	ATION R	-e.c -	CN SEGMI -1.0 73 587 142 62	3. C	. NT		17.0	15.0	7074L 73 591 148 65
CY LESS -4C -3C -7C -1C -2C			<b>PCCELER</b>	ATION R	* #155! -e.c 3	CN SEGME - 1.0 73 587 142	3. C	. NT		17.0	15.0	707 AL 73 591 148
CV LESS -4C -3C -7C -1C 1C 7C 30			<b>PCCELER</b>	ATION R	* #155! -e.c 3	CN SEGMI -1.0 73 587 142 62	3. C	. NT		17.0	15.0	7074L 73 591 148 65
CY LESS -4C -3C -7C -1C 1C 2C			<b>PCCELER</b>	ATION R	* #155! -e.c 3	CN SEGMI -1.0 73 587 142 62	3. C	. NT		12.0	19.0	717 AL 73 591 148 65

# TABLE XIII CYCLIC STICK PEAKS VERSUS AIRSPEED BY MISSION SEGMENT

	CYCLIC PE	ARS VS	VFLCC	177 87	<b>#1551</b>	NY SEGM	ENT ASC	ENT									
50	Less	46	.0		85	90	9%	100	105	110	115	120	129	130	139	140	TOTAL
LES																	
- 4	C		.1		. 1												196
1	3 31	15	36	17		',	6	';	ž	•	•						115
ļ	17	3	13	•	1	ı					1						17
3	ć																
TCTA		15	93	29	21	22	27	13	10	4							111

•	VCL 10 PE	ALS VS	VELCO	TT - 67	P1551	ON SECH	ENT PAN	UVE									
	PESS	46	40		85	90	99	100	101	110	119	1 20	125	130	135	140	TOTAL
LESS			,										1				4
-40 -30	4	3	14	3	- 7	20	10	19	16	16	19	•	9	•	1	5	159
-20 -10	31	43	335	120	166	105	173	155	• • •	47	70	:	?	1	ı		1393
-10	15	100	336 251	72 79	15	57	43	19	12	13	,	•	ż	í	2		663
50	i	7	•		ž	,		3		1							20
10							1										ı
TOTAL	70	275	947	200	119	322	201	102	120	85	47	11	17	13	•	2	3015

1	YCLIC PE	AKS VS	VELOC	TY	PISST	ON SEGM	ENT CES	CHT									
	LESS	40	60	.0	85	40	95	100	105	110	115	120	125	130	135	140 701	IAL
LESS -4C -90 -7C -1C 1C 2C	49 339 21 54	4 66 20 7	1 49 24 2	19	20	3 25 2	20 1	22 1	17	11	1					1	73 591 148 45
TOTAL	533	9 }	74	22	20	30	25	25	23	10	•		•			•	70

TABLE XIV
CYCLIC STICK PEAKS VERSUS ROTOR
RPM BY MISSION SEGMENT

	CYCLIC PE	AKS V	s e	PF 87	<b>#1551</b>	ON SEGMENT ASCENT
LESS	LESS	210	250	230	240	250 TOTAL
-40						
- 30			2		1	,
-20			40	115	i	156
- 10			44	8.9		135
10			14	24		34
30						
40						
TOTAL		1	135	224	?	131
	CYCLIC PE	Ars v	S #	PP 87	<b>#1551</b>	ON SEGMENT PANUVR
LESS	LESS	510	550	230	240	250 ,FOTAL
-40			- 1	3		
- 30			39	119	1	159
- 20			316	1069		1393
- 10			285	480	2	767
LS			3 3 1	315		463
30			13	15		20
40			•			1
TCTAL			986	2010	11	3619
						,
	CACFIC DE	WZ AZ		H 84	P15510	N SEGMENT DESCRIT
	LESS	210	220	230	340	250 TOTAL
LESS						
-46					_	
-30			37 255	35 334	1	73
-10			62	114	2	591 140
ic			35	30	•	65
20			ī	-		í
3C			-			The state of the s
4C						
TCTAL			190	403	5	878

TABLE XV
COLLECTIVE STICK PEAKS VERSUS COLLECTIVE STICK
STEADY BY CYCLIC STICK STEADY

				UL			374			
	LESS	10	50	30	40	50	60	70	40	90 TOTA
LESS -4C										
- 30										
-20										
-10					1					
10										
20										
30										
TCTAL					1					
10140					•					
TIPE	v.	0.	٥.	0.4	450.3	1189.4	64.0	0.2	0.	0. 1704.
C.	OFFECTIA	E PEAKS	AZ COL	L.STEA	DA MA C.	ACTIC 21	EACY	50		
	LESS	IC LC	50 A2 COT	L.STEA 30	40 40	9CL IC \$1	60	50 70	60	90 TOTA
LESS -40									•0	
LESS -40 -30						50			€0	
LESS -40 -30 -20					40 1	50			€0	
LESS -40 -30 -20 -10					40	50 1			€0	
LESS -40 -30 -20 -10					40 1	50			€0	
LESS -40 -30 -20 -10 10					40 1	50 1			€0	
LESS -40 -30 -20 -10 10 20					40 1	50 1			€0	
1622 -40 -30 -20 -10					40 1	50 1			€0	90 TOTAL

c	OLLECTIV	E PEAKS	VS CCL	L.STEAD	4 B4 C	VCLIC S	TEARY	60			
1655	LESS	10	50	30	40	50	40	70	80	•0	FOTAL
-40 -30 -23 -10 10						l 3					1
10 40 TCTAL						•					4
11=6	0.	0.	0.	0.1		49.7	11.5	0.	0.	0.	48.2

TABLE XVI
COLLECTIVE STICK PEAKS VERSUS COLLECTIVE STICK
STEADY BY DENSITY ALTITUDE

	COLLECTI	VE PEAKS	VS	COLL.	STEADY R	Y ALT	I TUO E	LESS			
	LESS	10	20	30	**	50	60	70		•0	TOTAL
LESS -40 -30											
- 20					,						2
10						1					1
10											
TETAL					2	1					3
TIPE	0.	0.	0.	0.4	19.4	4.6	c.	0.	0.	٥.	74.4
c	OLLECTIV	E PEAKS	vs c	OLL. S	TEACY BY	ALTI	TUDE	1000			
LESS	LESS	10	20	30	40	50	60	10	•0	90	TOTAL
-4C -10											
-70 -10					1						1
1C 20											
10 40											
TCTAL					1						1
TIPE	0.	0.	0.5	C. 6	33.0	51.0	0.3	0.	c.	0.	66.2
CO	LLECTIVE	PEAKS	vs co	LL. ST	EACY NY	ALTET	NDE S	000			
LESS	LESS	10	50	30	40	50	40	70	80	90 T	OTAL
-4C -30					1	1					1
-3C					2	1					1
1C 20											
30 40											
TETAL					3	•					15
TIFF	0.	0.	0.	1.2	470.5 11	43.2	98.4	1.1	c.	0. 17	14.3

TABLE XVII
COLLECTIVE STICK PEAKS VERSUS COLLECTIVE
STICK STEADY BY AIRSPEED

•	OLLECTIVE	PERKS	VS (	COLL. 51	IFATA NA	VE L OF	117	LESS			
	LESS	10	70	10	40	59	AC	70	90	₹0	TOTAL
-40						1					
- 10 - 2C					1	1					
-1C					4	•					11
3C						•					
4C TCTAL						•					19
TIPE	0.	0.	0.5	1.6	27.6	76.4	5.4	0.	0.	0.	111.9
CI LESS	LESS	PF#KS IC	50 A2 C	3C	4C	SO SO	AG AG	70	•0	40	TOTAL
-4C -30 -20 -1C 1C 2C						1					ı
-4C -10 -20 -1C						1					1

# TABLE XVIII COLLECTIVE STICK PEAKS VERSUS COLLECTIVE STICK STEADY BY ROTOR RPM

	OLLECTIV	E PEAKS	٧S	CCLL.	TFADY	BY RE	14	270			
LESS -40 -30	LLSS	ıc	20	90	40	50	60	70	60	90	70TA
-20 -10 20 -20					•	•				•	
TCTAL				•	4	•					
TIPE	G.	0.	0.3	0.0	207.1	759.3	54.2	0.	0.	0.	1021.
C	OLLECTIVE	PEAKS	42	ccii. s	TEACY F		H	210			
	LESS	10	20	30	4C	50	60	70		90	TOTAL
LESS -4C											
- 10					1	•					
-5C						1					
-10 10 20					1	1					
4C FCTAL					2	6					
TIPE	u.	0.	0.2	1.4	507.7	315.4	134.2	1.1	C.	9.	1954.
CO	LLECTIVE	PEAKS	A2 C	OLL. ST	EACY BY	RPM	ro	TAL			
	Less	10	20	30	4C	50	60	70	.0	90	TOTAL
LESS -4C						1					1
- 10					1						2
-50						Ĭ					. 1
30 50 10					•	ľ					12
4C CTAL						10					16
					-						,,,

# TABLE XIX COLLECTIVE STICK PEAKS VERSUS AIRSPEED ACCELERATION BY MISSION SEGMENT

	OLLECTI	VE PEA	S VS AC	CELERAT	104 8Y	MISS. S	FG. AS	CENT				
•			-13.0		-6.0	-1.0	3.0	4.0	9.0	13.0	19.0	TOTAL
LESS		-1704	-1110	- 700	- 67 0		,,,,	•••				
-40						2						2
- 30						l.						-1
-30					3	7	• •					10
-10					1	150	14	,	1			170 170
16						172		,	•			174
10						•						•
96												
TCTAL					4	316	30	•	ı			357
							:					
¢	OLLECTI	<b>VE PEA</b>	S VS AC	CELERAT	104 87	#155. S	EG. P4	NUVE				
	LESS	-15.6	-12-0	-9.0	-4.0	- 3.0	3.0	4.0	9.0	12.0	11.0	TOTAL
LESS			• • • • •		17.0							
-40						50	4	2				24
- 10			5	1	31	143	45	50	3			245
-20			;	10	95	1115	144	43	•			1079
-10 10			ı	7	43	922 213	33 10	2				237
20				•			1	•				•
30						•	•					•
-40												
TCTAL			•	24	149	1675	245	71				2222
	4 1 SC 7 1 W		S WS AC	ELERATI	ON 87 8		G. DES	CMT				
-									20.00			
	rrss	-15.C	-12.0	-9.0	-6.0	- 3. 0	3. C	4.0	9.0	12.0	15.0	TOTAL
LESS -40				1	3							10
-30					53	226						285
-20				ī	37	304	2					424
-10				•	)	95	-					94
10						36						36
50												
30												
46					94	747	2					853
TOTAL				•	70	747	•					•,,
				•								

# TABLE XX COLLECTIVE STICK PEAKS VERSUS AIRSPEED BY MISSION SEGMENT

	LESS	46	40	80	85	10	95	100	105	110	115	150	125	1 30	135	140	TGT
LESS	_																
-40	2																
- 30	_	_			_												
-50	3	.!				-											1
- ic	103	20	\$1		:	2	:	•									1
10	124	11	•	•		,	,		•								
-10 10 20 10	•																
30																	
TAL	236	44	33	7		10	•		4								
C	LLECTIV	E PEAKS	VS VEL	OC	Y P1551	O4 SEGM	ENT PAN										
Ci	ULECTIV	E PEAKS	VS VEL	0C11V 8	Y PISSI	04 SEGM	ENT PAN	EÚ3	105	110	119	120	125	130	135	140	101
<b>E</b> 5 5	LESS	40	60	•0	45	10			105	110	. 115	120	125	130	135	140	
E 5 5	LESS 2	40	60 11	#0 3	45 2		45 1	160		110	115	120	125	130	135	140	
ESS -40 -30	LESS 2 12	40 8	60 11 172	90 3 15	45 2 19	1	45 !	100	2	3	)	120	125	130	135	140	
ESS -40 -30	LESS 2 12 14	40 40 30 110	40 11 132 547	90 3 15	45 2 19	1 .	45 !	100	2	3	)	120	125	130	135	140	10
E 5 5 - 40 - 30 - 70 - 10	LESS 2 12 14	40 30 110 30	60 11 132 547 221	90 3 15 111 75	45 2 19 93	10 10 20 43	45 !	100	2	3	115	1 4	125	130	135	140	10
ESS -40 -30 -70 -10	LESS 2 12	40 40 30 110	40 11 132 547	90 3 15	45 2 19	1 .	45 1	160		3	)	1 4 6 3	125 5 1	130 4 3 1	135	140	i
ESS -40 -30 -70 -10	LESS 2 12 14	40 30 110 30	60 11 132 547 221	90 3 15 111 75	45 2 19 93	10 10 20 43	45 !	100	2	3	)	1 4 4 3	125 5 1	130 4 3 1	135	140	1
55 -40 -30 -70	LESS 2 12 14	40 30 110 30	60 11 132 547 221	90 3 15 111 75	45 2 19 93	10 10 20 43	45 !	100	2	3	)	1 4 4 3	125 5 1	130 4 3 1	135	140	1

TABLE XX - contd.

co	LLEGIIV	E PEAKS	VS VEL	OC   1 V B	P1551	ON SEGM	ENT CES	CNT									
	LESS	40	40	80	85	90	25	100	105	110	115	120	125	130	119	140	TOTAL
LESS																	
-4C	1	1	•		3	1											205
- 10	23	45	126	10	16	•	•	4									424
- 20	68	141	135	17	1.6	13	14	10	7	2		1					1
-40 -10 -20 -10 10 70 30	71		4	•		3	4	3	ı	3	1						36
10	32	2							1	ı							,,
20																	
3 G																	
40																	
FETAL	195	241	269	35	35	21	23	17	9	•	1	1					653

# TABLE XXI COLLECTIVE STICK PEAKS VERSUS ROTOR RPM BY MISSION SEGMENT

	COLLECTIV	E PEAKS	٧S	RPM	BY #155	TON SEGMENT ASCEN
	LESS	210	220	230	140	250 TOTAL
LESS -4C			2			2
- 30			•	1		i
-20			3	•	1	10
-10			73	97		170
10		1	95	74		170
50		1	2	1		•
30 40						
TOTAL		2	175	179	1	357
LESS -4G	DLLECTIVE LESS	210	550 A2	230	740	CN SEGMENT PANUVR 250 TOTAL 24
-30			501	219 670		245 1679 408
- 10						
-30 -20 -10 10 20			201	670 195	•	1C79 409
- 30 - 20 - 10 10 20 30			201 213 146	870 195 111	•	1679 409 257
-30 -20 -10 10 20			201 213 146	870 195 111	•	1679 409 257
-30 -20 -10 10 20 30 40			501 513 501	670 195 111	i	1079 609 257 6
- 30 - 20 - 10 10 30 40 TCTAL	LLECTIVE :	PEARS	501 513 501	670 199 111 4	10	1079 609 257 6
- 10 - 20 - 10 10 20 30 40 7CYAL			201 213 146 2	670 199 111 4	10	1074 609 257 6
- 30 - 20 - 10 10 30 40 TCTAL			201 213 146 2 583	1070 199 111 4 1621	10 10	1079 609 257 6 2222

### 

M	GUST	PEARS VS	veL.	BY MISS.	SEG. A	SCENT.	ALT.	2000. WG	7. 30000	,							
2.4 2.2 2.C 1.R 1.7 1.6 1.5	LESS	40	•0	•0	65	•0	95	100	105	110	115	120	125	130	135	140	TOTAL
1.2 0.0 0.7 0.6 0.5 0.4			2						1								,
LESS TOTAL			2						1								,
	2 GUS1	PEAKS V	s vec.	<b>0</b> 7 H155.	SEG.	ASCENT,	ALT.	2000, WG									
2.4 2.2 2.0 1.8 1.7 1.6 1.5	LESS	40	60	••	•5	•0	**	100	105	110	115	120	125	130	135	140	TOTAL
0.8 0.7 0.6 0.5 0.4	1	i I	1														1
LESS TOTAL	1	i	t														2
N	Z GUST	PEAKS V	S VEL.	BY MISS.	SEG. F	ANUVR.	ALT.	2000. WG	T. 2600	0							
2.4 2.2 2.6 1.8 1.7 1.6	LESS	40	<b>♦</b> 0	••	•5	•0	95	100	105	110	115	120	125	130	135	14(	TOTAL
1.3 1.4 1.3 0.8 0.7 0.6 0.5 0.4 0.2 L(SS			1	1			1										,
TOTAL			1	1			1										,

### TABLE XXII - contd.

NZ	GUST	PEAKS 1	S VEL.	MY MISS.	SEG.	MANUVA,	ALT.	5000' A	11. ZAOC								***
2.4 2.2 2.0 1.8 1.7 1.6	LESS	40	•0	40	<b>\$</b> 5	40	95	100	105	110	115	120	125	130	135	140 7	<b>JTAL</b>
1.5 1.4 1.3 1.2 0.6 0.7 0.6			1	i	П	1	1		•								,
0.4 0.2 LESS TOTAL			2	1	1	1	1		2								
NZ	GUST	PEAKS V	'S VEL.	RY MISS.	SEG.	MANUVR.	ALT.	2000, W	57. 30 <b>00</b> 0	ı	•						
	LESS	-0	•0	60	85	90	95	100	105	110	115	120	125	1 30	135	140 TI	DTAL
2.4 2.2 2.6 1.8 1.7 1.6 1.5							•										1
1.3 1.2 0.6 0.7 0.6 0.5 0.4			1	. 2	1	1	i		ı								•
LESS TOTAL			2	4	1	1	2		1								11
N.	GUST	PFAKS 1	ÝS VĒL.	AV HISS.	SFG.	MANUVR.	Al T.	2000. m	GT. 3200		. •					_	
	LESS		•0	80	85	90	95	100	105	110	115	150	125	130	135	140 T	DTAL
2.4 2.2 2.0 1.6 1.7 1.6 1.3 1.4 1.3 0.8 0.7 0.5 0.5 0.4 0.5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		40	1		• 7	•0	13	100	105	110		120	127	130	133	140 ,	1
LESS TOTAL			1														1

TABLE XXII - contd.

```
NE GUST PEARS WE WELL BY MISS. SEG. MANUVE, ALT. 5000, MGT. 26000
                                                                                                                                                                                 140 TOTAL
                                                                                                                                                 125
                                                                                                                                                            1 30
                                                                                                                                                                       135
                                                                                                                                      120
2.4
2.2
2.0
1.8
1.5
1.6
1.3
1.2
0.8
0.7
0.6
0.5
0.4
0.2
LESS
                                                                                                                                                                                       TOTAL
                                                                                                                          115
                                                                                                                                     120
                                                                                                                                                 125
                                                                                                                                                            130
                                                                                                                                                                      135
            LESS
2.4
2.2
2.0
1.0
1.7
1.5
1.4
1.3
1.2
0.8
0.7
0.0
0.5
0.4
0.5
1.5
1.5
1.5
1.7
       NE GUST PEARS WS WEL. BY MISS. SEG. DESCRIT, ALT. 2000, MGT. 30000
                                                                                                                           115
                                                                                                                                                 125
                                                                                                                                                            130
                                                                                                                                                                       135
                                                                                          100
                                                                                                                                     120
2.4
2.2
2.0
1.7
1.7
1.6
1.3
1.2
0.8
0.7
0.5
0.5
0.5
       NZ GUST PEARS VS VEL. BY MISS. SEG. DESCHT. ALT. 2300, MGT. 32000
                                                                                                                                                125
                                                                                                                                                           1 30
                                                                                                                                                                      135
                                      à
```

# TABLE XXIII GUST $n_{\mathbf{z}}$ VERSUS $\mu$ BY MISSION SEGMENT BY ALTITUDE BY $C_{\mathbf{T}}/\sigma$

4	s coz	T PEAKS V			SEG.	A SCENT					
• •	LES	0.00	0.05	0.10	0.15	0.20	0.25	C. 30	0.35	TOTAL	
2.4											
2.0											
1.0											
1.6											
1.5											
1.3											
0.8			1							ľ	
0.7					3		1			•	
0.4											
0.4											
0.2 LESS											
TOTAL			1		3		1			5	
ME	GUST	PEAKS VS	PU	BY MISS.	SEG.	MANUVR,	ALT.	2000, C1	/S 0.	12	
	LESS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.15	TOTAL	
2.4			•••	****		*****	****	0,70	0.,,		
5.5											
1.0											
1.7											
1.5											
1.4											
1.2					2	3	1			•	
0.8											
0.6											
0.5											
0.2											
TOTAL					2	,	1				
, , , , ,					•	•	•			•	
NZ	GUST	PEARS VS	#U	NY MISS.	SEG.	IANUVR.	ALT.	2000. CT	/5 0.1	5	
	LFSS		0.05						0.35		
2.4	(1.22	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.37	TOTAL	
2.2											
1.8											
1.7											
1.5											
1.4					1	3					
1.2					i	š	1			•	
0.8					3	1				•	
0.4					,	•				•	
0.5											
0.4											
TOTAL					•	7	1			17	
,					,	•	•				
h 2	GUST	PEAKS VS	8641	AV MICC	\$6G . *	ANIIVA .	ALT 4	1000 · C*	/s ^ •		
-76											
2.4	LESS	0.00	0.05	0.10	0.15	0.20	0.25	C.30	0.35	TOTAL	
2.2											
2.0 l.0											
1.7											
1.6											
1.4											
1.3						3					
0.8						,				3	
0.7					1	1				1	
0.5											
0.4											
LESS											
TOTAL					1	4				5	

### TABLE XXIII - contd.

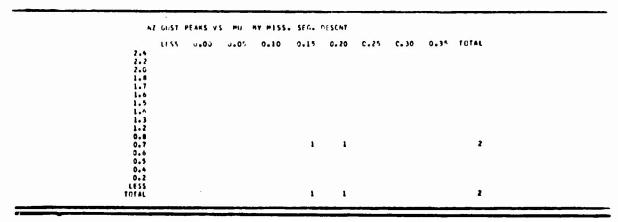
### TABLE XXIV GUST $\mathbf{n_z}$ VERSUS $\mu$ BY MISSION SEGMENT

NZ GUST PEAKS VS MU BY MISS. SEG. MANING

LESS 0.00 U.05 0.10 0.15 0.20 0.25 C.30 0.35 TOTAL

2.4
2.2
2.0
1.8
1.7
1.6
1.5
1.4
1.2
7 9 7 18
0.8
0.7
0.7
4 1 5
0.5
0.5
0.6
0.7
1 1 2 14 2 28

### TABLE XXIV - contd.



### 

N	2 GUST	PEAKS VS	VEL.	NY MESS.	SEG.	SCENT								3,00		-	
	Less	40	60	.0	85	90	95	100	105	110	115	120	125	130	135	140	TOTAL
2.4																	
2.0																	
1.0																	
1.0																	
1.5																	
1.3																	
1.2	1																1
0.5			3						1								4
0.6																	
0.5																	
0.4																	
LESS									1								5
TOTAL	ı		3						•								_
NZ	GUST	PFARS VS	VEL.	NY M155.	SEG. M	ANUVA								1.22			
	LESS	40	60	90	85	90	45	100	105	110	115	130	125	1 30	135	140	TO TAL
2.4																	
2.0																	
1.7																	
1.6																	
1.5																	
1.4			1		1	1 2	1										10
1.2			4	4	1	2	3	1	3								
0.7			1	3	1												5
0.6			•		-		1										1
0.5																	
0.4																	
LESS				_		3	5	1	3								28
TOTAL			6	7	3	,	,	•	,								
Ně	GUST F	FARS VS	VEL. M	Y MISS.	SEG. DE	SCNT											
	LESS	40	60	80	85	90	95	100	105	110	115	150	125	1 30	135	140	TOTAL
2.4																	
2.4 2.2 2.0																	
1.0																	
1.7																	
1.5																	
1.4																	
1.2																	
0.8			1				1										2
0.7			•				-										
0.5																	
0.4																	
LESS							1										2
FOTAL			1														_
													-				

### $\begin{array}{c} \text{TABLE XXVI} \\ \text{GUST } n_{\mathbf{z}} \text{ VERSUS } \mu \end{array}$

	MZ C	UST PEA	KS VS	MU CO	PUSITE						
2.4 2.2 2.0 1.8 1.7 1.6	LESS	0.00	0.05	0.10	C.15	G.20	0.25	C.30	0.35	TOTAL	
1.4 1.3 1.2			1		1 7	3	2			19	
0.8 0.7 0.6						2	1			11 1	
0.5 0.4 0.2 Less Tctal			1		16	15	3			35	

### $\begin{array}{c} \text{TABLE XXVII} \\ \text{GUST } n_{\mathbf{Z}} \text{ VERSUS AIRSPEED} \end{array}$

MZ	GUST P	EARS VS	AEFUCIL	A COM	POSTIE										
2.4 2.2	LESS	40	40	•0	0.5	90	95	100	105	110	115	120	125	130 / 139	140 T
2.4 2.2 2.0 1.7 1.6 1.5 1.4 1.3 1.2															
.3	ı		1	•	1	1 2	1	1	3						
.7			•	3	1		1		1						
.2															
ESS TAL	1		10	7	3	3	•	ı	•						

## TABLE XXVIII MANEUVER n<sub>z</sub> VERSUS AIRSPEED BY MISSION SEGMENT BY ALTITUDE BY GROSS WEIGHT

**	MANEU	VERS VS	VEL. C	V #155.	SEG.	ASCENT.	ALT.	LESS, W	GT. 300	00							
	LESS	40	60	80	85	90	95	100	105	110	115	120	125	130	135	140	TOTAL
2.4 2.2 2.0 1.8 1.7 1.6 1.5																	
1.4 1.3 1.2 0.8 0.7 0.6 0.5						1											ι
0.4 0.2 LESS TOTAL						1											ı
NZ	MANEL	VERS VS	VEL. 8	V M155.	SEG. A	SCENT.	ALT.	LESS, W	T. 3200	0							
	LESS	+0	•0	80	85	90	95	100	105	110	115	120	125	130	135	140	TOTAL
2.4 2.2 2.0 1.8 1.7 1.6 1.5																	
1.3 1.2 0.8 0.7 0.6 0.5		ı			•												1
0.2 LESS TOTAL		1															1
142	MANEUV	ERS VS	VEL. 91	WISS.	SEG. A	SCENT,	ALT.	1000, WG	T. 2600	0							
2.4 2.2 2.0 1.8 1.7	LE <b>SS</b>	40	•0	80	85	•0	95	100	105	110	115	120	125	130	135	140	TOTAL
1.5 1.4 1.3 1.2 0.8 0.7			2														2
0.5 0.4 0.1 LLSS TOTAL			2														
·			-														2
NZ	MANEUV	EKS VS	VEL. BY	MISS.	SEG. AS	SCENT, 4	LT. 1	000, <b>W</b> G1	. 2000	)							
2.4	LESS	40	46	•0	85	90	95	100	105	110	115	120	125	130	135	140	TOTAL
2.2 2.0 1.8 1.7 1.6																	
1.4 1.3 1.2 0.8 0.7 0.6			i														Ti.
0.2 LESS TCTAL			1														ı

```
NY PANELVERS 'NS VEL. NY MISS. SEG. ASCENT, ALT. 1000. MGT. 30000
                                                                                                                                                                         135
                                                                                                                                                  125
                                                                                                                                                             130
                                                                                                                             115
                                                                                                                                       120
                          40
                                                                                                                 110
2.4
2.2
2.0
1.8
1.7
1.5
1.4
1.3
1.2
0.7
0.5
0.5
0.4
0.2
LESS
                                                                                   1
       NE MAMELVERS VS VEL. BY MISS. SFG. ASCENT. ALT. 1000, MGT. 32000
                                                                                                                                                                          135
                                                                                                                             115
                                                                                                                                        120
                                                                                                                                                   125
                                                                                                                                                              130
                                                                                                                  110
                                                                                                                                                                                                 3
                             1
                                                                        1
                                                                                     2000, WGT. 28000
                                                                                                                            115
                                                                                                                                                  125
                                                                                                                                                              130
                                                                                                                                                                         135
                                                                                                                110
                                                                                                                                        120
2.4
2.2
2.0
1.8
1.7
1.6
1.3
1.4
1.3
0.8
0.7
0.6
0.5
0.4
0.5
5
0.4
0.5
                                                                                                                                                                                                 1
                                                                                                                                                                                                 1
                                                                                                                             115
                                       40
2.4
2.2
2.0
1.8
1.5
1.6
1.5
1.4
1.3
1.2
0.8
0.5
0.5
0.5
                                                                                                                                                                                                 5
                                                                                                                                                                                                13
                                                                        1
                                                                                    1
```

N	Z PANELY	ERS VS	VEL. M	¥ #155.	SEG. A	SCINT.	ALT.	2000. w	it. 3200	0							
2.4	LESS	40	•0	80	85	90	95	100	105	110	115	120	125	130	1 35	140	TOTAL
2.2 2.0 1.6 1.7																	
1.3	1	1		1			1		1								11
0.8 0.7 0.6 0.5	•	٠	3		ì	1	2										1
0.4 0.2 LESS	1	1	10	1	2	111	3		1								20
	! MANELVI				SEG. A			000. WG		1							
74	LESS	40	60	80	85	90	95	100	105	110	115	120	125	130	135	140	TOTAL
2.4 2.2 2.0 1.8 1.7 1.6 1.5 1.4 1.3 1.2 0.8						1											1
0.6 0.5 0.4 0.2 LESS OTAL						ī											1
N2	MANELVE	NS VS	VEL. BY	M155.	SEG. A	SCENT.	ALT. 5	oro, wg	T. 32000	N <sup>1</sup>							
2.4 2.2 2.0 1.8 1.7 1.6 1.5 1.4	LESS	40	60	•0	85	*6	•5	100	105	110	115	120	152	130	135	140	1914L
0.8 0.7 0.6 0.5					2				1								3
O.Z LESS OTAL					2				ı								,
					SEG. MA		47. 16	€€. <u>16</u> 1	. 24000								
NZ	LESS	40	70 A:F. DA	#135.	85	90	95	100	105	110	115	120	125	130	135	140	TOTAL
2.4 7.2 2.0 1.8 1.7 1.6	., .,																
1.4 1.3 1.2 0.8		1	5		2	1	2	1 2	1	2			1			,	5 73
0.6																	

TABLE XXVIII - contd.

	- manda	VERS VS	V61. 6	V M144.	166. H	AMLING .	A1 T	# E E E . WG	T. 2800	10						
7.		****	VEL- "	., ~133.	35.0.											
2.4 2.2 2.0 1.0	LESS	40	●0	•0	•5	+0	99	100	104	110	115	120	125	130	135	140 TOTAL
2.2 2.0 1.7 1.0 1.3 1.3 1.2 0.8 0.7			1		1	1	1	, 2 11	1 2	1						1 d 14 02
1.2 0.6 0.7			15	10	12	13	14	11	3	1	2	2				2
0.4 0.2 LESS Total			22	10	13	15	15	IJ	•	2	2	2				98
<b>n</b> ;	2 FAMEU	VERS VS	VEL. I	N #135.	SEG. P	ANUVR.	ALT. I	LESS. WG	T. 3000	00						
					85	90	95	100	105	110	115	120	125	130	135	140 TOTAL
2.4 2.2 2.0 1.8 1.7 1.6	LESS	••	<b>≜</b> 0	•0	••	••	**	100	104	110	***	120	***		•••	
1.3 1.2			12	•	•	•		3								37
0.8 0.7 0.6 0.5		•	2					1								,
0.4 0.2 LESS TOTAL		1	14	•	•	•		•								40
N/	E MANEU	reas vs	VEL. A	Y #155.	SEG. M	NUVR.	ALT. 1	000, WG	T. 2400	0						
	LESS	40	40	80	85	90	95	100	105	110	115	120	125	L 30	135	140 TOTAL
2.4 2.2 2.0 1.8 1.7 1.6 1.5 1.4 1.3 1.2 0.8																
0.5						1		1		1						1
0.2 LESS TOTAL						1		1	•	1						,
ps 7	MAMELIN	ERS VS	VEL. 81	: * #155.	SEG. MA	MUVR. 4	LT. 1	000, WG1	. 28900							
-46	LESS	40	40	80	85	90	95	100	105	110	115	750	125	130	135	140 TOTAL
2.4 2.2 2.6 1.8 1.7	C. 33	70	50		•,	••	• •		•••	•••	•••					3
1.5 1.4 1.3 1.7		ı	2	3	141	2	1 5	1 2	1	1 5		3	1	1		2 16 36
0.7 0.5 0.5 0.4 0.2						1			1			1				3
LESS TOTAL		ı	7	•		5	•	,	•	•		٠	2	2		57

TABLE XXVIII - contd.

	A MANEUS	/F#S V	S WEL.	AV #15	S. Sec.	PANIEVR.	AL 1.	1000. W	GT. 300	00		-					
2.4	t: \$5	40	60		#5	90	95	100	105	110	115	130	125	1 30	135	140	TOTAL
2.2 2.0 1.A																	
1.7																	
1.5 1.4 1.3		1 2	,		2	3	1 2 5	?	1	2	1	2					1 20 49
1.7 0.8 0.7		2	1		2	3	,	2	•	3	1	1 2	,	,	1		15
0.¢ 0.5 0.4		1							1								
0.2				9	9	10	10	,	. ,	,	,	5	3	3	1		87
TOTAL		•	12	•	•	10	10	_ '		ĺ		ŕ	Í	•	-		
٨	LISS	EHS VS	5 VEL.	87 MISS	. SFG. 1	PANUVR,	ALT. 1	100 w	105	110	115	120	125	130	135	140	TOTAL
2.4 2.2 2.0	1133	40	80	~0	47	,,	*,	100	•0,	•••	•••	••	•••				
1.8																	
1.5																	
1.3 1.2 0.8		1		1	2												2
0.7				1													1
0.5 0.4 0.2																	
TOTAL		1		٠	2												7
41	MANELVE	RS VS	VEL.	NY MISS.	SEG. M	ANUVR.	ALT. 2	O <b>CO. W</b> G	7. 2600	0							
2.4	LFSS	40	60	90	65	90	95	100	105	110	115	170	125	130	1 35	140	TOTAL
2.0 1.8 1.7																	
1.6			1		2	1			_								.1
1.4		1 9	1 16 31	1 17	1 1 8	2 5	3		2	2	3 1	1 1 1	1	1			12 23 89
0.H 0.7 0.6	1	1	12	5	6	3	2										29
0.5			1														1
LESS TOTAL	1	11	5.8	23	1.0	14	15		•	4	٠	3	1	1			161
	PANEL VE LESS	**S VS	60 60	. 00	SFG. M	90	95 95	100	105	110	115	120	125	130	135	140	TOTAL
2.4 2.2 2.0																	
1.8			1	1	1		1										1 2
1.5		2		1 5	1 5	. 3	1	1	i 3 9	3	3	* 7	2	3	1 2		5 10 59
1.3 1.2 0.6	3	31	201	67	21 71	65	13	14 35	2a 13	23	17	13	•	3	1	1	175 611
0.7	3	12	6M 14 1	15	17 1 1	17	,	2	6	5	1	1		1			158 25
0.4 0.2 USS					-				•					•			•
TOTAL	7	4.8	338	100	116	104	75	62	61	43	35	36	14	12	4	1	1058

TABLE XXVIII - contd.

N	Z PANEUV	EHS VS	VEL. •	v MISS.	SFG.	ANUVR.	ALT.	2000. W	61. 300	00							
2.4	1.55	40	60	80	85	90	95	100	105	110	115	120	125	1 30	135	140	TOTAL
2.2 2.6 1.8 1.7																	
1.6					2					2	1					1	5
1.4		1,	61	4 26	17	. A	1	. 4	15	1 6		6	• ;	3	2		15
0.0	2	45	585	105	91	109	79	18 73	40	15	13	16	2	6	3	2	916
0.7 0.6 0.5 0.4	,	23	101	25	30 3 2	25	17	16	î	•		2	,				252 32 4
TOTAL	•	76	475	164	151	172	132	112	74	78	46	34	1#	16	7	,	1567
***	PANEUVI	RS VS	VEL. A	v MISS.	SEG. 4	ANUVR.	ALT. 2	300 . wG	1. 3200	0							
2.4 2.2 2.0 1.6 1.7 1.6 1.5 1.4	LESS	•0	•0	80	85	90	95	100	10-	110	115	120	125	130	135	140	TOTAL
1.3				1 5	,		,	i		1							23
1.2 0.0 0.7 0.6 0.5		•	,	í		;	1										10
LESS TOTAL		1	,	,	7			,	1								37
	MANELVE	• • •	VEL. B					•••									
	LESS	40	60	# #ISS.	85	90	95	100	T. 2600	110	115	120	125	130	135	140	TOTAL
2.4 2.2 2.0 1.8 1.7 1.6 1.5 1.4 1.3 1.2 0.8																	
1.5			1			•	1										1 2
1.2			;	•	;	2	•	3	,	2							31 31
0.7 0.6 0.5 0.4		1		1	1	1											2
LESS		1	•	,	,	•	•	,	,	2							43
NE	MANELVE	ns vs	VEL. NY	MISS.	SEG. MA	NUVR. A	LT. 50	ca. wil	. 24000								
	LFSS	40	•0	80	85	90	45	100	105	110	115	120	125	130	135	140	TUTAL
2.4 2.2 2.0 1.8 1.7 1.6																	
1.5			1,		,	1		ļ		,	1 2			1			6 20
1.2		,	10	11	10	ıi	11	15	1,	1	1 2						89 89
1.4 1.3 1.2 0.6 0.7 0.6 0.5 0.4	٠	2	16 2 1	3	,	1	•	1	?								31 3
CTAL	1	,	45	14	16	10	16	16	15	,							
														1 .			1 >6

AZ MANILLYERS VS VEL. RY MISS. SEG. DESCRIT, ALT. LESS, MGT. 30000	1 1 2	1		1 1	1 1	;	;	?	;	1 1 5	2 1 15 000, wg1	10 5 17 ALT. 5	20	6 29 SFG. M	23 Y MISS.	29 17 54 VEL. H1	6 10 RS VS	
10 54 23 29 20 17 15 5 5 2 4 3 2  NZ MANELVERS VS VEL. HY MISS. SEG. MANUVR. ALT. 5000, MGT. 32000  1155 40 60 80 85 90 95 100 105 110 115 120 125 130 135	2	,	133	•	,	,		,	,	1 1 5	2 1 15 000, wg1	10 5 17 ALT. 5	20	6 29 SFG. M	23 Y MISS.	29 17 54 VEL. H1	6 10 RS VS	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2	,	135	•	,	,		,	,	1 1 5	2 1 15 000, wg1	10 5 17 ALT. 5	20	6 29 SFG. M	23 Y MISS.	29 17 54 VEL. H1	6 10 RS VS	
4 29 16 22 14 10 10 1 4 2 2 1 6 17 4 6 3 5 2 1 10 54 23 29 20 17 15 5 5 2 4 3 2  MANHLUFERS VS VEL. HY MISS. SEG. MANUVR. ALT. 5000. MGT. 32000  11 55 40 60 80 85 90 95 100 105 110 115 120 125 130 135  1  MANHLUFERS VS VEL. RY MISS. SEG. DESCRIT, ALT. LESS. MGT. 30000  11 55 40 60 80 85 90 95 100 105 110 115 120 125 130 135	2	,	135	•	,	,		,	,	1 1 5	2 1 15 000, wg1	10 5 17 ALT. 5	20	6 29 SFG. M	23 Y MISS.	29 17 54 VEL. H1	6 10 RS VS	
4 29 16 22 14 10 10 1 4 2 2 1 1 1 6 17 4 6 3 5 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2	,	135	•	,	,		,	,	1 1 5	2 1 15 000, wg1	10 5 17 ALT. 5	20	6 29 SFG. M	23 Y MISS.	29 17 54 VEL. H1	6 10 RS VS	
1 29 16 22 14 10 10 1 4 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2	,	135	•	•	,			,	5 . 32000	2 1 15 000, wg1	17 ALT. 5	20	6 29 SFG. M	23 Y MISS.	29 17 54 VEL. H1	6 10 RS VS	
6 17 4 6 3 5 2 1  10 54 23 29 20 17 15 5 5 2 4 3 2  MANHUVENS VS VEL. HY MISS. SEG. MANUVR. ALT. 50CO, MGT. 32000  1155 40 60 80 85 90 95 100 105 110 115 120 125 130 135  1  PANHUVENS VS VEL. HY MISS. SEG. DESCHT. ALT. LESS. MGT. 300CO 1155 40 60 80 85 90 95 100 105 110 115 120 125 130 135 1	2	,	135	•	•	,			,	5 • 32000	2 1 15 000, wg1	17 ALT. 5	20	29 SFG. M	23 Y MISS.	54 VEL. HY	10 RS VS	
1 10 54 23 29 20 17 15 5 5 7 4 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		,	155						,	5 • 32000	1 15 000, WG1	17 ALT. 5	ZO	29 SFG. M	23 Y MISS.	54 VEL. HY	10 RS VS	
PANILIVERS VS VEL. HV MISS. SEG. MANUUR, ALT. 5000, MGT. 92000  155 40 60 80 85 90 95 100 104 110 114 120 125 130 135  1  ANILIVERS VS VEL. BY MISS. SEG. DESCMT, ALT. LESS, MGT. 30000  155 40 60 80 85 90 95 100 105 110 115 120 125 130 135 1			135						,	. 32000	)CO, WG1	AL T. 5	ANUVR.	SFG. MA	Y MISS.	VEL. HY	KS VS	
MANHLVERS VS VEL. NV MISS. SEG. MANUVR, ALT. 5000, MGT. 32000  11 SS 40 60 80 85 90 95 100 10 115 120 125 130 135  1  MANHLVERS VS VEL. NV MISS. SEG. DESCMT. ALT. LESS. MGT. 30000  LLSS 40 60 80 85 90 95 100 105 110 115 120 125 130 135 1			135						,	. 32000	)CO, WG1	AL T. 5	ANUVR.	SFG. MA	Y MISS.	VEL. HY	KS VS	
MANHLVERS VS VEL. NV MISS. SEG. MANUVR, ALT. 5000, MGT. 32000  11 SS 40 60 80 85 90 95 100 10 115 120 125 130 135  1  MANHLVERS VS VEL. NV MISS. SEG. DESCMT. ALT. LESS. MGT. 30000  LLSS 40 60 80 85 90 95 100 105 110 115 120 125 130 135 1			135						,	. 32000	)CO, WG1	AL T. 5	ANUVR.	SFG. MA	Y MISS.	VEL. HY	KS VS	
1  1  1  1  NAMELVERS VS VEL. BY MISS. SEG. DESCRIT, ALT. LESS. WGT. 300CO 255 40 60 80 85 90 95 100 105 110 115 120 125 130 135 1	40	140	155	139	130	125	120	115										
1  INVANELVERS VS VEL. RY MISS. SEG. DESCRIT, ALT. LESS. NGT. 300C0 1.55 40 60 80 85 90 95 100 105 110 115 120 125 130 135 1	40	140	195	139	130	125	120	115										
1 MANIELVERS VS VEL. BY MISS. SEG. DESCRIT, ALT. LESS. WGT. 30000 LLSS 40 60 80 85 90 95 100 105 110 115 120 125 130 135 1		140	•		130		120	ur	110		100							
1 PANILVERS VS VEL. RY MISS. SEG. NESCRIT, ALT. LESS. WGT. 300CO LISS 40 60 80 85 90 95 100 10° 110 115 120 125 130 135 1																		
1 ANFLYERS VS VEL. NY MISS. SEG. NESCNT, ALT. LESS. WGT. 300CO LSS 40 60 A0 A5 90 95 100 105 110 115 120 125 130 135 1																		
1 PANILVERS VS VEL. RY MISS. SEG. NESCRIT, ALT. LESS. WGT. 300CO LISS 40 60 80 85 90 95 100 10° 110 115 120 125 130 135 1																		
1 PANILVERS VS VEL. RY MISS. SEG. NESCRIT, ALT. LESS. WGT. 300CO LISS 40 60 80 85 90 95 100 10° 110 115 120 125 130 135 1																		
1 PANILVERS VS VEL- RY MISS. SEG. DESCRIT, ALT. LESS. WGT. 300CO LLSS 40 60 80 85 90 95 100 10° 110 115 120 125 130 135 1																		
1 PANILVERS VS VEL. RY MISS. SEG. NESCRIT, ALT. LESS. WGT. 300CO LISS 40 60 80 85 90 95 100 10° 110 115 120 125 130 135 1																		
1 MANILVERS VS VEL. RY MISS. SEG. DESCRIT. ALT. LESS. WGT. 300CO LLSS 40 60 80 85 90 95 100 10° 110 115 120 125 130 135 1																		
MANILVERS VS VEL. RY MISS. SEG. DESCRIT, ALT. LESS. WGT. 300CO LLSS 40 60 RO AS 90 95 100 10° 110 115 120 125 130 135 1													•					
PANILVERS VS VEL. RY MISS. SEG. DESCRIT, ALT. LESS. WGT. 300CO																		
MANILVERS VS VEL. RY MISS. SEG. DESCRIT, ALT. LESS. WGT. 300CO LLSS 40 60 RO AS 90 95 100 10° 110 115 120 125 130 135 1																		
LLSS 40 60 A0 A5 90 95 100 105 110 115 120 125 130 135 1													1					
1	٠٠ ١	140	35	135	130	125	120	115	110									tess
1																		
																,		
																,		
MANELVERS VS VEL. RY MISS. SEG. DESCNT, ALT. 1000. mgT. 25000										24000	n. <b>.</b> c.t.		SCMT. A	SEG. DES	m155.			PANEL VE
	0 1	140	95 1	135	130	125	120	115	110									
·										1								

TABLE XXVIII - contd.

```
NJ MANELVERS US WEL. BY MISS. SEG. DESCRIT, ALT. 1000, MGT. 24000
                                                                                                                                                                            140 TOTAL
                                                                                                                                                                 135
                                                                                                                                            125
                                                                                                                                                      1 10
                                    60
                                              60
                                                                                                                      115
                                                                                                                                 120
            MANEUVERS US VEL. RY MISS. SEG. DESCRY, ALT. 1000, MGT. 30000
                                                                                                                                                                            140 TOTAL
                                                                                                                                             125
                                                                                                                                                       130
                                                                                                                                                                 135
                                                                                                                                 120
2.4
2.2
2.0
1.8
1.7
1.6
1.5
1.4
1.3
0.8
0.7
0.0
0.5
0.5
0.2
1.55
1.74
        NE MAMELUERS US VEL. NY MISS. SEG. DESCHT, ALT. 1000, MGT. 32000
                                                                                        100
                                                                                                          110
                                                                                                                      115
2.4
2.2
2.0
1.8
1.7
1.4
1.3
1.2
0.7
0.5
0.5
0.5
TCTAL
                                                                                                                                                                                         1
                                                                                              105
2.4
2.2
2.C
1.8
1.0
1.5
1.4
1.3
1.2
0.8
0.7
0.5
0.5
0.4
LESS
                                                                                                                                                                                      15
```

TABLE XXVIII - contd.

```
NZ MANELVERS - WS VEL. RY MISS, SEG. CESCNE, ALT. 2000, MGT. 24000
                                                                                                                                         120
                                                                                                                                                     125
                                                                                                                                                                130
                                                                                                                                                                            135
                                                                                                                                                                                      140
                           40
2.4
2.7
2.5
1.7
1.6
1.3
1.4
1.3
0.7
0.6
0.5
0.4
0.5
0.4
                                                                                     ?
                                                                                                1
                                                                                                           1
                                                                         1
                                                                                                                                                                                                   14
        NZ MANELVERS - VS VEL. RV MISS. SEG. DESCRIT, ALT. 2000, MGT. 30000
                                                                                                                                                                                     140 TOTAL
                                                                                            100
                                                                                                       105
                                                                                                                  110
2.4
2.2
2.0
1.8
1.7
1.5
1.4
1.3
1.2
0.8
0.7
0.6
0.5
0.5
0.2
LESS
                                                                                                                                                                                                   37
                                       16
        NZ MANELVERS - VS VFL. HY MISS. SFG. DESCHT. ALT. 2000, MGT. 32000
                                                                                                                                                                                     140 TOTAL
                                                                                                       105 110
                                                                                                                                                    125
                                                                                                                                                                           135
                                                                                            100
                                                                                                                             115
                                                                                                                                         120
                                                                                                                                                                130
2.6
2.2
2.6
1.8
1.7
1.6
1.5
1.4
1.3
1.2
0.8
0.7
0.6
0.5
0.5
0.4
0.5
1.5
1.7
                            1
                                                                                                                                                                                                  10
        NZ MANEUVERS - VS VEL. BY MISS. SEG. DESCNI, ALT. 5000, WGT. 21000
2.4
2.2
2.0
1.4
1.7
1.6
1.5
1.4
0.6
0.7
0.6
0.5
0.4
0.5
0.4
0.5
TOTAL
                                                                                                                     ı
                                                                                                                     1
```

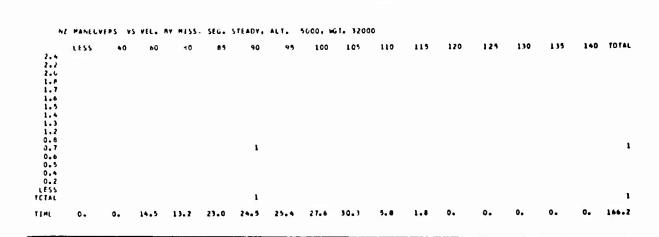
TABLE XXVIII - contd.

,	, MA'41 1	yrus y	. Vft.	ny miss	Stire I	9 SC41.	AL T.	5000, W	1. 2400	10							
2.4 2.2 2.7 1.1 1.7 1.7 1.5 1.6	1 4,	<b>4</b> 3	<b>*</b> (	, 0	Ah	90	95	100	105	110	115	120	125	130	135	140	TOTAL
0.7								1	1	1							,
LESS TETAL								ı	1	1							,
•,	./ WA'er (	A	VEL.	HY MISS.	SFG.	nescat.	AL T.	5000. wi	it. 1000	00							
2.4 2.2 2.1 1.1 1.7 1.1	1155	40	60	90	45	90	25	100	105	110	115	120	125	130	135	140	TOTAL
1.7 3.1 0.7 0.6 3.5 0.4 0.7							1	1		1							1 2
TOTAL							1	1		1							3
	7 * 8 * 0 1 1	// N N N N		N #155.	516. 5	It ADV.	ALT. L	ESS. Wi	T. 3000	0							
	1155	40	6	RO	85	90	95	100	105	110	115	120	125	130	135	140	TOTAL
2.4 2.2 2.0 1.8 1.7 1.6 1.6																	
1.3 1.7 7.8 7.8 7.8 7.8 7.8					1			1									1
11.5					2			1									3
112	4.4	2.8	4.7	0.6	0.5	1.4	0.9	1.4	1.0	2.	0.	0.	0.	0.	0.	0.	17.1
٨	Z MATE LI	/ F P S V S	VEL.	NY MISS.	SEG. S	TEADY.	ALT. 1	oco, wG	1. 3000	0							
2.4 C 1.4 1.7 1.6 1.5 1.4 1.7 0.7 0.7	1155	٨٥	•0	A0	ns.	90	<b>15</b>	100	105	110	115	120	125	130	135	140	2 1
C tiltat							1			ı	1	1					4
T # W	2.2	0.4	5.7	4.6	3.0	3.6	6.1	9.1	7.9	5.7	3.5	7.0	0.6	0.2	0.	0.	•0.4

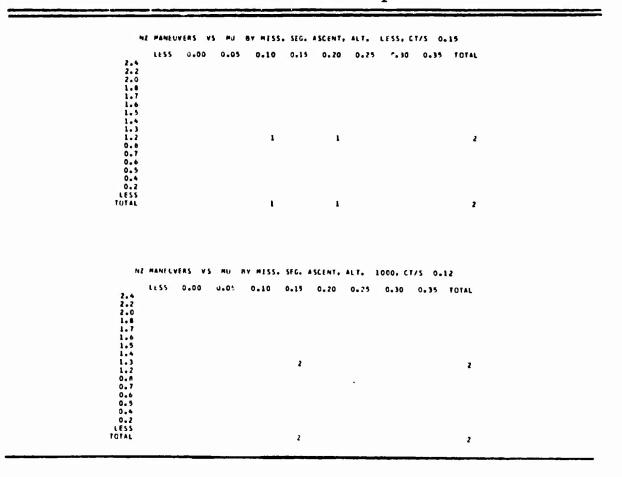
TABLE XXVIII - contd.

٠.	2 #49/1 1.55		S VFL.	40 HV 4155	. 556. 85	STEADY.	. ≜( T. - 95			110	115	120	175	1 10	135	140	TITAL
2.4 2.4 7.0 1.4 1.7 1.5 1.4 1.3 1.6 0.7	1.33	40	6.		1	40	r	1 00	10'	110	117	120	167	130	13,	140	ı
0.5 0.4 0.2																	
TOTAL					1												1
TIM	1.4	0.	0.	0.4	2.1	4.9	F.2	19.0	14.7	6.7	0.6	0.	0.	0.	0.	0.	51.1
^				HA MICE					HGT. 240								
2.4 7.2 2.6 1.4 1.7 1.6 1.5	1155	40	60	*0	AS	90	95	100	104	110	115	170	175	130	115	140	TOTAL
1.2 0.8 0.7 0.6 0.5					٠	1		1		ı							7
TESS					6	1		2		1							10
TIML	6.3	0.8	10.9	14.4	20.5	24.8	42.6	43.4	35. 1	21.2	3.6	0.A	0.	0.	0.	0.	274.7
1.7	MANEL	VERS V	S VFL.	HY H155,	SF G.	STEADY.	ALT.	2000.	G1. 396	00							
2.4 2.2 2.0 1.8 1.7 1.6 1.5	(+ \$\$	40	<b>(</b> )	нО	AS	90	46	100	105	110	115	120	125	136	135	140 7	TOTAL
1.3			2	1	1	1	ì	2		1	t						13
0.6 0.7 0.6 0.5 0.4						2			,	5	1						11
TOTAL			i	1	1	3	1	2	5	6	4						25
TTM	52.0	3.3	63.3	61.7	90.5	104.6	159.A	275.2	109.7	78.0	19.9	2.0	0.	0.	0.	0. 10	69.5
14.				HY MISS.													
2.4 2.2 2.6 1.6 1.7 1.6 1.3 1.2 0.7 C.r 0.5 0.4 0.7 1.75 1.75	TOS	40	6(	***	65	90	95	100	105	1	115	120	125	130	135	140	101AL 4 1
116	35.9	1.0	41.5	74.0	33.7	17.7	44.5	78.6	48.	17.6	1.5	0.	٥.	0.	0.	0.	369.0

	Z MANE	LVERS V	s vec.	AV #155	. SFG.	STEADY	. ALT.	5010.	ы, Т. 26	000							
2.4 2.7 2.0 1.8 1.7 1.6 1.5 1.4 1.3 1.2 0.8	LFSS	40	•0	R O	8.	90	94	100	105	110	119	120	125	110	1 15	140	
0.7 0.6 0.5 0.4 0.2 LESS								1									i
TCTAL TIM-	0.	0.	1.4	1.6	3.	1 1.7	7.	1 7•1		11.5	0.4	0.	0.	0.	0.	<b>7</b> •	51.7
NZ	MANEL	VERS VS	VEL.	Y MISS.	SEG.	STEADY.	AL T.	5000, W	GT. 280	00							
2.4 2.2 2.0 1.6 1.7 1.6 1.5	LFSS	40	<b>6</b> 0	•0	45	90	95	100	105	110	119	120	125	130	135	140	JATCT
1.2 0.8 0.7 0.6 0.5 0.4 0.2 LESS						1	2										1
TOPAL	٥.	c.	2.5	4.4	11.1	22.0	30.4	32.0	32.0	10.7	1,5	0.1	0.	0.	0.	0.	150.7
	maner	wees we			•••			4040	c	•							
72	MANEL!	¥€#3 <b>¥</b> 3	VEL.	80 HISS.	85	90	95	5000. w	105	110	115	120	125	130	135	140	TOTAL
2.4 2.2 2.6 1.8 1.7 1.6 1.5																	
1.2 0.6 0.7 0.6 0.5			1		1	1		t		1							2
LESS			1		1	•		1		ı							•
I FM-	0.	0.5	74.3	59.7	91.9	122.2	132.1	146.0	117.7	34.8	3.8	0.6	0.	0.	0.	0.	783.8



## TABLE XXIX MANEUVER $n_z$ VERSUS $\mu$ BY MISSION SEGMENT BY ALTITUDE BY $C_T/\sigma$



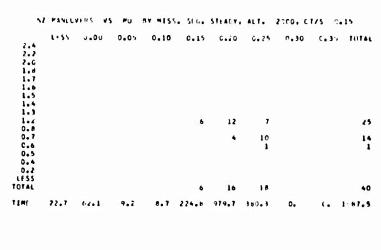
```
NZ MANELYEPS VS MIJ NY MISS. SEG. ASCENT. ALT. 1000. CT/S 0.15
           LESS C.00 U.OF 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
                                                                                       10
2.4
2.2
2.0
1.8
1.7
1.6
1.5
1.7
0.8
0.7
0.5
0.5
0.5
0.5
      NZ MANEUVERS VS MU HY MISS. SEG. MANUAR, ALT. LESS, CT/S 0.12
          LESS J.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
2.4
2.2
2.0
1.6
1.5
1.6
1.3
1.2
0.8
0.7
0.5
0.5
0.5
0.5
                                             33
                                      2
                                             41
                                                     79
                                                              13
                                                                                     135
```

.,,	PANEL		S Mu	HV MISS.	SI Go	- AMINE	ALT.	1155. (	T/S 0.15
,,	1655	:•00	U.04	0.10	0.15		0.75		0.35 TOTAL
2.4 2.2 2.6 1.8 1.7 1.6 1.5	,,,,		•••	•••	0.1,		0.7	(*)0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
1.3				1	10	8			10
0.6				-	1	1			2
0.6 0.5 0.4 0.2 1.55									
TOTAL				1	11	9			21
N?	MANEUV	f#S V	s #U	AV HISS.	SFG.	MANUVR.	AL T.	10 <b>c</b> a, c	T/S 0.12
	LESS	٥٠.٥٥	0.0	0.10	0.15	0.20	0.25	n. 30	C.35 TOTAL
2.4 2.7 2.0 1.6 1.7 1.6 1.5				1	1	1	3		1
1.2 0.8				1	•	•		5	26
0.7 0.6 0.5 0.4 0.2 LESS						2			2
TOTAL				2	7	15	11	2	37
ME	MANEUV	ERS V	s Mu	BY MISS.	se G.	MANUVR,	ALT.	1000, C1	/5 0.15
2.4 2.2 2.0 1.8 1.7 1.6	1155	6.00	0.65	0.10	C.15	0.20	0.25	C.30	C.34 TOTAL
1.4				2	7	10	10	1	30
1.2 0.8 0.7				•	10	27	11	5	65
0.6 0.5 0.4 0.2				1	ì	i	7		17
TOTAL				7 .	30	47	27	6	117
NZ	MAN( UVE	+5 VS	MU I	av HISS.	SEG. P	IANUVE.	A1 T	1000. CT	/S C.12
	LESS	J.00	0.05		0.15	0.20	0.24	r.30	0.3' TOTAL
2.4 2.7 2.0 1.8 1.7									
1.5					1	1	1		1 5
1.4			1	. 3	24	11	16	1 2	25 59
1.2 0.8 0.7				17	15	47	17	3	143
0.6					2	47	•	1	36 4 3
0.2					•				,
TOTAL			1	28	117	89	44	7	266

```
NZ MANELVERS VS MU MY MISS. SEG. MANUVE, ALT. 2000, C'/S 0.15
   2.4
2.2
2.0
1.8
1.5
1.6
1.3
1.2
0.7
0.6
0.5
0.4
0.2
LESS
                                                                            17
44
98
177
                                                                            26
2
1
                                                                                        1
                                                                                                        2532
                                                                  946
                                                                            369
                                             198
        NZ MAMEUVERS VS MU RY MISS. SEG. MANUVR, ALT. 50°0, CT/S 0.12
            LESS 0.00 0.05 0.10 0.15 0.20 G.25 0.30 0.35 TOTAL
 2.4
2.2
2.0
1.0
1.7
1.5
1.4
1.3
1.2
0.7
0.6
0.5
0.5
0.5
TCTAL
        NZ MANELVERS VS MU BY MISS. SEG. MANUWR. ALT. 5000, CT/S 0.15
2.4
2.2
2.0
1.8
1.7
1.6
1.3
1.2
0.8
0.7
0.9
0.9
0.2
LESS
YCTAL
                                                                15
                                                                           1
7
7
20
                                                                                                       15
39
237
                                                       17
62
36
                                             12
                                                                                      2
                                                                                                         70
                                             10
                                             22
                                                      142
                                                                176
       NZ MANEUVERS US MU NY MISS. SEG. DESCRIT, ALT. LISS, CT/S C-15
           LESS 0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
2.4
2.2
2.0
1.8
1.7
1.6
1.3
1.4
1.3
0.6
0.7
0.6
0.5
0.4
0.5
0.4
0.5
1.5
0.4
```

```
NZ MANJUYERS VS MU BY MISS. SEG. DESCRIT, ALT. 1000, CT/S 0.12
          LES: 0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
      NZ MANEUVERS VS MU BY MISS. SEG. DESCHT, ALT. 1000, CT/S 3.19
         LESS 0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
      NZ MANEUVERS VS MU BY MISS. SEG. DESCHT, ALT. 2000, CT/S 0.12
        LESS 0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
2.4
2.2
2.0
1.0
1.5
1.6
1.3
1.2
0.8
0.7
0.5
0.4
0.5
0.5
0.5
0.4
     NZ MANEUVERS VS MU NY MISS. SEG. DESCNT, ALT. 2000. CT/S 0.15
        LESS 0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
2.4
2.2
2.0
1.8
1.5
1.4
1.3
1.2
0.8
0.7
0.5
0.4
0.5
1.5
1.2
```

```
NZ MANELVERS VS MU RY MISS. SEG. DESCRY. ALT. 5000. CT/S 0.15
               0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
      ME MANELVERS US MU MY MISS. SEG. STEADY, ALT. LESS. CT/S 0.15
               0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
 TIME
     NE MANELVERS VS MU NY MISS. SEG. STEADY, ALT. 1000, CT/S 0.15
              0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 TOTAL
                          0.10 0.15 0.20 0.25 C.30 0.35 TOTAL
2.4
2.2
2.0
1.0
1.7
1.6
1.3
1.3
1.3
0.8
0.7
0.8
0.7
0.8
TIME
```



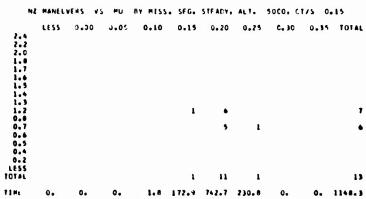


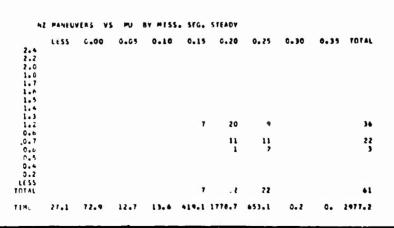
TABLE XXX MANEUVER  $n_{\mathbf{z}}$  VERSUS  $\mu$  BY MISSION SEGMENT

N	Z MANEU	VEHS VS	MU	84 HISS.	SEG.	ASCENT					
	LESS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	TOTAL	
2.4											
2.2											
2.0											
1.5											
1.4											
1.4 1.7 1.6 1.5											
1.4											
1.3					3					3	
1.2			2	3	10	4	1			3	
0.8 0.7											
0.7			1	1	•	•	1			21	
0.6						1				1	
0.4											
0.2											
LESS											
TOTAL			3	4	30	14	2			53	

TABLE XXX - contd.

NZ	MANEL	VEHS V	S MU	AV M155	SFG.	MANUVR				
2.4	LFSS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	TOTAL
2.2										
1.7					1	1 2		1		1
1.4					ī	5	4	-		10
1.5						14	19	6		45
1.4				•	31	63	5.8	13		169
1.3			1	25	159	207	139	20		551
0.8		1	6	147	406	865	242	30	ı	2100
0.7				72	248	100	38	2		556
0.4				13	34	16	72	•		73
0.5				• •	1	ï	i	1		10
0.4					-	-	•	•		•••
0.2										
LESS										
TOTAL		1	21	241	1297	1362	503	73	1	3519

N.	Z PANEU	VERS VS	Mu	NY MISS.	SEG.	DESCNT				
	LESS	3.00	0.05	0.10	0.15	0.20	0.25	0.30	0. 35	TOTAL
2.4										
2.2										
2.0										
1.0										
1.7										
1.6										
1.5										
1.4					1					1
1.3						1				5
1.2		1		7	31	20	3			62
0 . A		•				••	-			
0.7				•	4	15				31
0.6				-		• •	-			
0.5										
0.4										,
0.2										•
LESS										
TOTAL		1		11	40	36	11			99



## TABLE XXXI MANEUVER n<sub>z</sub> VERSUS AIRSPEED BY MISSION SEGMENT

ħ,	Z MAPREL	IERS VS	VFL.	NY MISS	. SEG.	ASCENT											
	LESS	40	60	80	45	90	95	100	105	110	115	120	125	130	135	140	TOTAL
.0			•			٠											
.5	_	3	, 14	1		2	2		1								2.5
). A ). A ). A ). S		ı		,	3	3	3		1								21
14E	2	•	23		4	5	•		?								51
N	/ MANELY	FRS V	VEL.	RY HISS	. SFG.	HANUVR											
2.4	LESS	40	60	80	85	90	95	100	105	110	115	120	125	130	135	140	TOTAL
2.0																	1
. 7			ı	1	,		1	1	ı	3	1					1	10
l . 5 l . 4		3	21	10	10	3 16	2 15	15	7 20	í 12	15	5 16	5	3 7	1		169
2	1 5	98	137	42 256	45 247	58 232	149	156	36 97	34 93	36 37	29 34	13	11	, 5	•	2100
0.8	5	45	221	56	65	61	16	24	10	•	6 1	6	3			1	554 73
0.5	2	5	39	î	3	•	-1	•	1		٠			1			10
D.Z ESS TAL	13	160	1043	376	305	377	298	246	107	152	100	90	42	37	12	٠	3519
N	2 MANELY	reas vs	VEL.	AV MISS	. SFG.	DESCNT											
. 4	LESS	40	●0	*0	85	90	75	100	105	110	115	120	125	1 30	1 35	140	TOTAL
.2			ī										•				1
. 3	1	,	3 21	1	1	•	5	2	3								42
). 8 ). 7 ). 6		3	3	2	3	,	•	2	3	•							31
0.4 0.2 555 TAL	ı	10	28	12	12	1	10	•		5							99
h	/ MANEL	VERS V	S VEL.	BY MISS	. SEG.	STEADY											
	LESS	40	60	40	85	40	95	100	105	110	115	120	125	130	1 35	140	TOTAL
2.4 2.2 2.C 1.6 1.7 1.6																	
1.3 1.2			3	1	ą.	7	1	6		3	2						3
0.7					1	5	3	2	2	7	2	1					2
0.5					•						•	•					
ESS			•	1	11	12	4	•	6	10	5	1					
Mſ	111.9	10.0	230.9	107.7	260.2	351.9	463.5	584.3	496.5	196.1	41.2	13.3	1.4	0.2	0.	0.	2917.

TABLE XXXII MANEUVER  $n_{\mathbf{z}}$  VERSUS  $\mu$ 

	NZ I	PANFUVERS	٧s	MU CO	POSITE					
	LESS	0.00	0.05	0.10	0.15	C.20	0.25	0. 30	0.35	TOTAL
2.4										
2.2										
2.0										
1.4						1				1
1.7					1	2		ı		4
1.6					1	9	4			10 45
1.5					6	14	19	6 13 20 30		45
1.4				4	32	63	5.6	13		170
1.3			1	25	166	208	139	20		559
1.2		2	10	157	862	909	255	30	1	5559
0.8										
0.7			9	77	261	223	58	2		630
0.6			4	13	36	10	1			77
0.5					7	1	1	1		10
0.4										
0.2										
1523										
TCTAL		2	24	276	1374	1444	538	73	1	3732

TABLE XXXIII MANEUVER  $n_{\mathbf{z}}$  VERSUS AIRSPEED

	LISS	•0	60	60	85	90	95	100	105	110	115	120	125	130	135	140	101
4																	
2																	
. (																	
. 7			1													•	
65437476542							,	•	;	í	:	4	5	3	1		
?			27	10	10	14	16	15	20	12	, ,	16	5	7	4		1
•		,	142	44	46	16	15	15	36	34	36	29	13	11	2		
;	- :	108	654	270	264	247	197	164	105	12 34 96	36	16 29 34	5 13 16	11	5	4	22
		100	0,74		•••		•	•	••								
7	5	44	231	61	72	74	47	28	24	21	8 2	6	3			1	4
į.	ź	5	39		•	74	47	28	2		2	1					
5	•		4	1	3				1					1			
2																	
5																	
L	16	174	1097	397	412	405	317	258	196	167	105	91	42	37	12	6	3

 $\begin{array}{c} \text{TABLE XXXIV} \\ \text{PEAK } n_{\mathbf{x}} \text{ VERSUS AIRSPEED BY GROSS WEIGHT} \end{array}$ 

	NA PF	AKS FOR	N/ VS	VELO	CITY BY	wells	11 20	าวาา									
	LESS	40	60	<b>#</b> 0	45	90	94	100	105	110	115	120	125	110	115	140	TOTAL
LESS -0.40																	
-0.15																	
-0.25																	
-0.20 -0.15																	
0.10	32									1	1	1					15
0.15	7																7
0.25	•																
0.30																	
O.4C TCTAL	35									1	1	1					18
	NX PE	AKS FOR	AX VS	VELO	CITY RY	we LG	41 21	1000									
	LESS	40	60	.0	65	90	94	100	105	119	115	150	125	1 10	135	140	TOTAL
LESS -0.40																	
-0.35 -0.30																	
-0.25																	
-0.15										•	ı	1	,		t		,
-0.10	*3	2	3		t				1								100
0.15	î																1
0.25																	
0.40															,		112
TCTAL	100	2	3		1				1		ı	ι	2		•		•••
	NX PE	AKS FOR	NK VS	VELOC	:11v Av	WEIGH	IT 30	220									
	LESS	40	60	80	45	90	95	100	105	110	115	120	125	110	135	140	TOTAL
LESS -0.40																	
-0.35																	
-0.29							•										
-0.15			ı		1					1	1	1	2	ı	ı	1	10
0.10	355	ι	2								1						159
0.15 0.20	36																30
0.25																	1
0.35																	
TCTAL	401	1	3		1					ı	,	1	2	ι	ı	1	415
			115					300									
					ITY BY			200							135	140	TOTAL
LESS	LESS	40	60	40	85	90	45	100	105	110	115	120	125	1 10	117	140	111146
-0.40 -0.35																	
-0.10																	
-0.20																	
- 3. LC	298	1															299
0.10	36	•															34
0.25	2																•
0.10																	
O. 4C	336	1															337
_																	

 $\begin{array}{c} \text{TABLE XXXV} \\ \text{PEAK } n_{\mathbf{X}} \text{ VERSUS AIRSPEED BY ALTITUDE} \end{array}$ 

			_														
	AE BEAK		NK VS	VELCCII		AL TOTAL		F55	1.15	110	115	120	125	1 10	135	140	tot
55	LESS	•0	60	#0	45	¥0	115	100			•••	• • • •	•				
4C																	
30																	
20																	
10	_																
10	95 l		1														
20																	
30																	
43	56		1														
	ME PEAR		MX VS					1000	105	110	115	120	125	1 10	115	149	10
55	LESS	40	60	80	85	40	95	เวจ	137	110	•••	•••	•••	• • •	•	-	
40																	
10																	
20												1					
10	10.																
	12																
20	l l																
20	ı																
20 25 10 35	•											•					
20 25 10 35	200											t i					
20 25 10 35	200		NK V,	AEFOC11		AL 1   1   1		001	101	110	1119	1 20	125	130	135	140	to
.19 .20 .25 .10 .35 .40 TAL	200	S FCR 40	NX V.	WELOC 11	fV BV	4L T   T   90	JDE 2	000 000	101	110	1119		125	130	135	140	10
20 25 10 35 40 40	200								t01	110	115		125	130	135	140	fa
. 20 . 25 . 10 . 35 . 40 . 18 . 40 . 15 . 30 . 25	200								101	110	1115		125	130		140	to
320 ,25 ,10 ,35 ,40 ,40 ,41 ,40 ,40 ,40 ,40 ,40 ,40 ,40 ,40 ,40 ,40	200								105	110	1115		125	130	135	140	fo
20 25 16 15 14 14 15 15 16 17 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18	200 NA PEAK LESS		•0		••				101			120				140	te
20 25 10 35 40 14 15 30 25 10 10 11 10 10 11 11 20	200 MA PEAKS LESS	40	•0		1					1	,	120				140	te
20 25 40 35 40 46 41 41 41 41 41 41 41 41 41 41 41 41 41	200 WA PEAR! LESS	40	•0		1					1	,	120				140	to
20 25 35 46 45 35 46 45 36 25 27 27 27 27 27 27 27 27 27 27 27 27 27	200 WA PEAK! LESS	•0	1		1 1				ı	1 1	2	1 20	,	1	2	140	
20 25 35 46 45 35 46 45 36 25 27 27 27 27 27 27 27 27 27 27 27 27 27	200 MA PEAKS LESS	40	•0		1					1	,	120				140	
20 25 35 35 40 35 40 35 40 35 40 14 15 25 20 25 30 25 30 25 30 30 30 30 30 30 30 30 30 30 30 30 30	200 WA PEAK LESS	**	•0	<b>a</b> O	1 1	90		100	ı	1 1	2	1 20	,	1	2	140	
20 25 35 44 55 615 625 73 74 75 75 75 75 75 75 75 75 75 75 75 75 75	200 WA PEARS LESS 533 69 10 1	40 4	9 NX VS	#O	1 1 2	90		100	ı	1 1	2	1 20	,	1	2	140	
20 21 21 21 21 21 21 21 21 21 21 21 21 21	200 WA PEAK LESS	**	•0	<b>a</b> O	1 1	90		100	1	1 1	,	1 1 20	3	1	2		
23 23 23 23 23 23 24 25 25 26 27 27 27 27 27 27 27 27 27 27 27 27 27	200 WA PEARS LESS 533 69 10 1	40 4	9 NX VS	#O	1 1 2	90		100	1	1 1	,	1 1 20	3	1	2		
23 23 23 23 23 23 23 23 23 23 23 23 23 2	200 WA PEARS LESS 533 69 10 1	40 4	9 NX VS	#O	1 1 2	90		100	1	1 1	,	1 1 20	3	1	2		
23 23 25 35 36 35 36 37 36 37 37 37 37 37 37 37 37 37 37 37 37 37	200 WA PEARS LESS 533 69 10 1	40 4	9 NX VS	#O	1 1 2	90		100	1	1 1	,	1 1 20	3	1	2		
23 23 25 35 36 36 37 37 37 37 37 37 37 37 37 37 37 37 37	200 WA PEARS LESS 533 69 10 1	40 4	9 NX VS	#O	1 1 2	90		100	1	1 1	,	1 1 2 2	3	1	2	140	
23 24 25 25 36 36 36 37 36 37 37 37 37 37 37 37 37 37 37 37 37 37	200 WA PEAK* LESS S33 60 10 1 613 WA PEAK	40 4	9 NX VS	#O	1 1 2	90		100	1	1 1	,	1 1 2 2	3	1	2	140	
23 25 25 25 25 25 25 25 25 25 25 25 25 25	200 WA PEAK* LESS S33 60 10 1 613 WA PEAK	40 4	9 NX VS	#O	1 1 2	90		100	1	1 1	,	1 1 2 2	3	1	2	140	
20 25 10 35 40 141 15 30	200 WA PEAK* LESS S33 60 10 1 613 WA PEAK	40 4	9 NX VS	#O	1 1 2	90		100	1	1 1	,	1 1 2 2	3	1	2	140	

TABLE XXXV - contd.

	'IA PEAG	ts FCP	NE VS	VILOSITA	, A4	AL FET	וים זמני	TAL									
	Liss	40	50	m O	85	90	75	100	105	110	115	170	125	130	135	140	TOTAL
5.5 4.0 15 10 25																	
5			ı		t					ı	2	7	4	1	2	ι	1
5	77s 82 11 1	•	,	•	1				1	1	2	1					79 8.
<b>5</b>	872	•	6		2				ı	,	4	3	•	1	2	ι	90

TABLE XXXVI PEAK  $n_{\mathbf{x}}$  VERSUS CYCLIC STICK POSITION BY MISSION SEGMENT

•											
_	LESS	10	20	10	•0	50	6 C	70	0.0	10	TOTAL
LESS											
-0.40											
-0.35											
-0.10											
-0.25											
-0.20											
-0.15											
-0.10					-	_					
0.10	ı			6	404	5					416
C. 15				2	32	ı	l				36
0.20					5						5
0.25											
0.30											
2.35											
0.40				A							457
FCTAL	ı			•	441	6	t				97/
•											
		FCR NA	vs cvcl	IC STEA	CV 9V #	155 <b>.</b> 56	G. PANU	٧R			
	PEAKS F								#O	<b>7</b> 0 1	TOTAL
48		FOR NA	<b>∀</b> \$ C∀CL	TC STEA	CV 9V H	155. SE 50		VR 70	*0	<b>90</b>	FOTAL
	PEAKS F								<b>8</b> 0	<b>9</b> 0	FOTAL
4x LESS	PEAKS F								<b>8</b> 0	70	FOTAL
4x LESS -0.40 -0.35 -0.10	PEAKS F								<b>8</b> 0	<b>7</b> 0	FOTAL
UESS -0.40 -0.35 -0.40	PEAKS F								<b>8</b> 0	70	FOTAL
LESS -0.40 -0.15 -0.10 -0.25 -0.25	PEAKS F	10	20	10	40				80	<b>7</b> 0	
LESS -0.40 -0.15 -0.40 -0.25 -0.20	PEAKS F								<b>8</b> 0	<b>70</b>	TOTAL
UESS -0.40 -0.15 -0.10 -0.25 -0.20 -0.15	PEAKS F	10	20	10	• 0	50			ėŋ	<b>7</b> 0	15
LESS -0.40 -0.15 -0.10 -0.25 -0.20 -0.15 -0.10	PEAKS F	10	20	10	40				<b>8</b> 0	<b>7</b> 0	15
LESS -0.40 -0.15 -0.10 -0.25 -0.26 -0.15 -0.10	PEAKS F	10	20	10	• 0	50			80	70	15
LESS -0.40 -0.15 -0.10 -0.25 -0.25 -0.15 -0.10 0.10	PEAKS F	10	20	10	40	50			80	70	15
LESS -0.40 -0.15 -0.10 -0.25 -0.25 -0.15 -0.10 0.10 0.20	PEAKS F	10	20	10	40	50			ėО	<b>7</b> 0	15
-0.40 -0.35 -0.40 -0.35 -0.25 -0.25 -0.15 -0.15 0.10 0.12 0.30	PEAKS F	10	20	10	40	50			<b>8</b> 0	<b>70</b>	15
LESS -000 -0.15 -0.40 -0.25 -0.26 -0.15 -0.15 0.10 0.10 0.10	PEAKS F	10	20	10	40	50			ėО	70	15
××	PEAKS F	10	20	10	40	50			80	<b>70</b>	15
-0.40 -0.35 -0.40 -0.35 -0.25 -0.25 -0.15 -0.15 -0.15 -0.26 -0.30	PEAKS F	10	20	9 2	40	30			80	70	15

TABLE XXXVI - contd.

	٩x	PEARS	FOR NX	AZ CALFI	C 51F	ADV RV	#155. SF	G. DESC	NT			
		LESS	10	20	30	40	50	60	70	80	70	TOTAL
LESS												
-0.40												
-0.19												
-0.10												
-0.25												
-0.20												
-0.15												
-0.10												
0.10					5	288	6					299
0.15						11						31
0.20						•						6
0.25						1						ĭ
9. 10						-						_
9.35												
0.40												
TOTAL					5	324	6					339

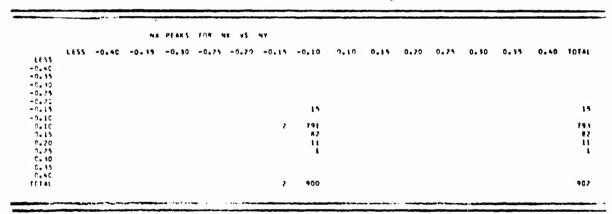
	NX	PEARS	FOR N	e vs cv	CLIC S	7E407 8	v 4155.	SEG. ST	EADY			
		LESS	10	20	30	40	50	69	70		70	TOTAL
LES												
-0.4												
-0.1												
-0. 1	0											
-0.2	5											
-0.2	0											
-0. I	•											
-0.1	0											
0.1	C				2	56	2					60
0.1	5					12						12
0.20						• • •						••
0.2												
0. 10												
0. 1												
0. 4												
TCTA					2	6.6	2					17
TIME		u.	0.	0.	199.3	1704.1	1007.9	68.2	2.5	0.	0.	2977.2

	NI P	EAKS	FOR NX	VS CYC	IC STE	ADY NY	155. 51	eg. Ya	TAL			
		LSS	10	20	30	40	50	60	70	80	90	TOTAL
LEST												
-1.40												
-0. 19												
-1.13												
-0.29												
-2.20	}											
-0.19	•		ı	1	9	4						15
- C. LC												
0.10		ı			1.5	761	16					793
0.15	•				?	7.4	1	1				82
0.20						11						11
0.25	,					1						ı
0. 10	)											
3. 15												
3.40												
TCTAL		ı	1	ı	26	655	17	ı				902

TABLE XXXVII PEAK  $n_x$  VERSUS  $n_z$ 

			42	PFAFS	FOR 47 VS	98								
2.4	L:55	-9.46	-0,15	-0.40	-0.25 -0.20	-0.15 -0.10	1.10	0.15	0.70	2.25	2.10	0.35	0.40	TOTAL
2.7 2.0 1.5														
1.7						1	ı.							?
1.4						1	*	1						5
0.f 3.7 0.6						13	740	AL	11	1				096
0.5														
0.7 1555 15741						14	793	87	11	1				907

TABLE XXXVIII PEAK  $n_x$  VERSUS  $n_y$ 



 $\begin{array}{c} \text{TABLE XXXIX} \\ \text{PEAK } n_y \text{ VERSUS AIRSPEED BY GROSS WEIGHT} \end{array}$ 

	NY PE	KS FOR	AA AA	VELOC	LTV A	A METCH	17 26	000									
	LESS	•0	<b>h</b> 0	40	45	40	94	133	135	110	115	120	125	1 10	135	140	TOTA
5	2		1		ı	2	11										
	2				1												
	•		1		,	2	1										1

TABLE XXXIX - contd.

	ans for			ITY NY			000								14
LESS	•0	60	60	85	90	95	100	105	110	115	120	125	1 30	135	
											1				
2		•	2	1	3	•	ı	3		2		1			
121							ı	1		1					
2		,		2		1	ı.	•		•					
4		9	2	1	3	9	2	•		,	1	1			
NY PE	AKS FOR	AA A	V ELO	CITY BY	METG	HT 30	000								
ESS	40	60	.0	85	90	35	100	105	110	115	120	125	130	135	ı
12		9	•	•	1	2	2	2				1		1	
		-			•	-	_	_				-		•	
1.6		•	•	1	)			L	1						
31		1.0	•	7	4	2	2	3	2			1		t	
NY PE	ARS FOR	NY V	S VELO	CETY RY	WEIG	HT 32	300								
LESS	40	60	.0	65	90	95	100	135	110	119	150	125	130	135	
														•	
1		1	ı												
•		•													
12		1													
1															
19		2	1												

TABLE XL
PEAK ny VERSUS AIRSPEED BY ALTITUDE

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1

TABLE XL - contd.

	MA NEWE	S FCR	MA A2		14 44	AL TETI		000				120	125	130	135	140	INTAL
LFSS -0.40 -0.35 -0.10	LESS	40	60	80	As	90	44	100	105	110	115	120	127	130	• • • • • • • • • • • • • • • • • • • •		
-0.25 -0.26 -0.15 -0.13	•			ı											1		5
0.10 7.15 7.20 7.25 0.10 0.35	4		i														10
TCTAL	1		i	1											ı		
	NY PEA	KS FCR	NY VS	<b>VELOC</b>	17V 81	ALTE	ruot a	2000								140	TOTAL
-0.4C -0.15 -0.10	LESS	40	<b>6</b> 0	80	85	90	95	100	105	110	115	150	125	130	135	140	1
-0.25 -0.20	1 ? 16		l e	5	5	6	11	,	3		2	L	1				69
-0.15 -0.10 0.10 0.15	30		11	•	•	1	1	1	5	ł	ı						60 1
0.29 0.39 0.30 0.15	ì																1
0.4C TCTAL	50		21	10	-11	9	12	•	•	2	,	ı	ı				135
	NY PEA	KS FCR	NY VS	VELOC	LTY AY	ALTII	UDF 5	000									_•
LESS -0.40 -0.15 -0.10	LESS	40	60	80	85	90	95	100	105	110	115	150	125	130	135	140	TOTAL
-0.20 -0.15 -0.10 0.10 0.15 0.20 0.25 9.10			1	1	ı								1				,
CTAL			1	L	ı				ı				ı				5
	NY PEA	KS FCR	NY VS	VELOC	ITY RY	ALTI	UDE TO	TAL									
LESS -0.40 -0.35 -0.30	LESS	•0	60	#0	45	90	95	100	105	110	115	170	125	130	135	140	TOTAL
-0.25 -0.20 -0.15	1 2 23		17	,		6	11	1,1	•		2	ı	2		ı		1 3 ·
-0.10 0.15 0.20	14		13	•	٠	,	ï	1	2	ì	1		-		•		67
0.25 0.35 0.35 0.40	ı																1
17141	18		' 0	12	12	4)	12	•	1	2	3	ı	2		1		151

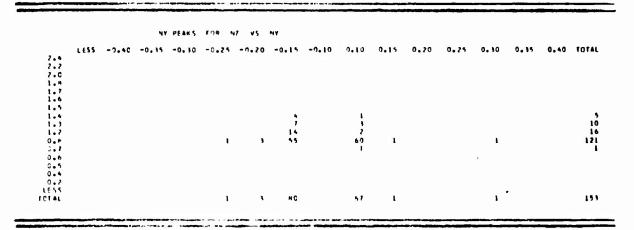
# TABLE XLI PEAK ny VERSUS CYCLIC STICK POSITION BY MISSION SEGMENT

	LESS	10	20	30	42	50	60	10		90 TOTAL
55			-							
4C 35										
10										
25 20										
15					5	1				é
I O				ı	15	1	1			16
15				•	• •	•	•			•
20										
13										
15 10										
41				1	20	2	1			24
								nu ė		
~~		FOR NY							• •	40 TOTAL
5	ress	10	20	30	40	50	60	10	80	70 111120
C										
0										
5					1					i
0 <b>5</b>				•	53	1				•0
C				•	21	5	1			31
5					i					1
5										
u										
S C										
ι				10	76	6	1			93
	O.ANS	Ena NY	vt rvr	L 1C <b>51</b> F1	LOV AV H	ISS. SE	G. DESC	NT		
	PrAKS LESS	FOR NY	48 C4C	LIC 57E1	10V RV H	155. SE	G. DESC	4T 70	•0	90 TOTAL
s c									80	90 TOTAL
\$ C									60	
\$ C 5					40				60	
5 0 5					40				60	
5				30	1 2 8	50			60	1 2 10
5				30	1 7	50			60	. 1
5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0				30	1 2 8	50			0	1 2 10
5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0				30	1 2 8	50			60	1 2 10
5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0				30	1 7 8	50			60	1 2 10 14
50505050505050				30	1 7 8	50			60	1 2 10
50505050505050				10	1 2 8	1			80	1 2 10 14
5 C 5 C 5 C 5 C 5 C 5 C C 5 C C 5 C C 5 C C 5 C C C C C C C C C C C C C C C C C C C C	LESS		20	10 1	1 2 6	1	60		60	1 2 10 14
\$ C C C C C C C C C C C C C C C C C C C	LESS	10	20	1	1 2 6	1	60	70	60	1 2 10 14
\$ C 5 C 5 C 5 C 5 C 5 C 5 C 5 C 5 C 5 C	LESS	IG FGK NY	A2 CAC	1 L	1 2 6 ANY RY 1	1 1 etss. si	60	FO FO		1 2 10 14
\$ c 5 c 5 c 5 c 5 c 5 c 5 c 5 c 5 c 5 c	LESS	IG FGK NY	A2 CAC	1 L	1 2 6 ANY RY 1	1 1 etss. si	60	FO FO		1 2 10 14
\$0.5050505050L W	LESS	IG FGK NY	A2 CAC	1 L	1 2 6 ANY RY 1	1 1 etss. si	60	FO FO		1 2 10 14
\$6505050605050L Y	LESS	IG FGK NY	A2 CAC	1 L	1 7 8 14 1 26 ANY RY J	1 1 etss. si	60	FO FO		1 2 10 14 1 2 A 90 TOTAL
\$05050505050L V	LESS	IG FGK NY	A2 CAC	1 L	1 7 8 14 1 26 ANY RY 1	1 1 etss. si	60	FO FO		1 2 10 14 1 2 A 90 TOTAL
\$65650566505050L	LESS	IG FGK NY	A2 CAC	1 L	1 7 8 14 1 26 ANY RY J	1 1 etss. si	60	FO FO		1 2 10 14 1 2 A 90 TOTAL
	LESS	IG FGK NY	A2 CAC	1 L	1 7 8 14 1 26 ANY RY 1	1 1 etss. si	60	FO FO		1 2 10 14 1 2 A 90 TOTAL
\$0505050505050L Y \$0505050C505	LESS	IG FGK NY	A2 CAC	1 L	1 7 8 14 1 26 ANY RY 1	1 1 etss. si	60	FO FO		1 2 10 14 1 2 A 90 TOTAL
\$050505050505000 V	LESS	IG FGK NY	A2 CAC	1 L	1 7 8 14 1 26 ANY RY 1	1 1 etss. si	60	FO FO		1 2 10 14 1 2 A 90 TOTAL
\$0.50.50.50.50.50.50.50.50.50.50.50.50.50	LESS	IG FGK NY	A2 CAC	1 L	1 7 8 14 1 26 ANY RY 1	1 1 etss. si	60	FO FO		1 2 10 14 1 2 A 90 TOTAL

TABLE XLI - contd.

TOTAL	30	4.7	70	V.C.	40	4.7	10	13	10	Liss
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1						ŧ				
						•				
153				7		130	1.7			

 $\begin{array}{c} \text{TABLE XLII} \\ \text{PEAK } n_{\textbf{y}} \text{ VERSUS } n_{\textbf{z}} \end{array}$ 



 $\begin{array}{c} \text{TABLE XLIII} \\ \text{PEAK n}_{\textbf{y}} \text{ VERSUS n}_{\textbf{x}} \end{array}$ 

			NY	PFAKS	FIR NY VS	NX									
	Liss	-0.40	-0.15	-0.30	-0.25 -0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	TOTAL
(															
. 15															
. 1C								1							1
25							10	i	1						- 3 A 0
15							10	7	1						MO
10							37	20	7	2					67
15							1								1
2 C															
. 25															1
15															
4.0							109	32	•	,					153
ΑL							101	,,,	•	•	•				• • • •

 $\begin{array}{c} {\rm TABLE~XLIV} \\ {\rm PEAK~n_{Z}~VERSUS~n_{X}} \end{array}$ 

		MZ	-	R PEAKS	FOR	NZ VS	MX									
	LESS	-0.40	-0.35	-0.30	-0.29	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.10	0.35	0.40	*
2.4																
2 - 5																
7.0																
i.;																
1.4								10								
1.5								**								
1.4								167	i							
1.3							1	558								
1.2							i	2221	2	2						
0.0																
0.7							4	959								
0.4								77								
0.5								10								
0.4																
0.5																
LESS																
TETAL							6	1719	6	2						

 $\begin{array}{c} {\tt TABLE~XLV} \\ {\tt PEAK~n_z~VERSUS~n_y} \end{array}$ 

		MZ	MAMEUA	R PEAKS	FOR	MS A2	MY									
2.4	LESS	-0.40	-0.19	-0.30	-0.25	-0.20	-0.15	-0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.40	TOTAL
2.2																
1.0								1								
1.7																
1.0								10								14
1.5								45								4
1.4							2	168								1.7
1.3							3	999	1							55
1.2							5	555 2214	5	2						222
0.8																
0.7								677	3							631
0.6								7.7								7
0.4								10								10
0.4																
0.2																
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TAL							10	3711	9	2						3737

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DOCUMENT CO	NTROL DATA - R&		the overall report is classified)
1 ORIGINATING ACTIVITY (Corporate author)			RT SECURITY CLASSIFICATION
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3 REPORT TITLE		N/A	
FLIGHT LOADS INVESTIGATION O	E COMBAT A	BMED	AND ARMORED
CH-47A HELICOPTERS OPERATIN			
4 DESCRIPTIVE NOTES (Type of report and inclusive dates)	d III boe IIII		···
Final Technical Report			
S AUTHOR(S) (Last name, first name, initial)	<del></del>		
Giessler, F. Joseph			
Braun, Joseph F.			
6 REPORT DATE	78 TOTAL NO OF P	AGES	76 NO OF REPS
March 1968	104		3
BE CONTRACT OR GRANT NO	SE ORIGINATOR'S R	EPORT NUM	BER(S)
DA 44-177-AMC-363(T)	USAAVLABS	Techni	ical Report 68-1
370			.cor .cop .co
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segments: (1) takeoff and ascent; (2			
ing; and (4) steady state. Data are			
rence tables, histograms, and exce time spent in the mission segments			
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each of the mission segments, and			
parameters; and the time to reach of			
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load factor was 1.95, which occurr			
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transport CH-47A's whose activity			
the armed CH-47A's spent more tha			
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